

RECORD

F. R. Fosberg
 Collection Book #23
 #29473 — 30146

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 copied for file B.D.

Plant	
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Collection and Field Note Book

No. 23

(Jan. 25, 1948 - Sept. 25, 1948)

(29473 - 30146)

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E N D

ALIEN SPECIES IN ISLAND ECOSYSTEMS 1. Native Home

Name	Family	Animal	Plant
Native Country or Region	Chromosome No.	Voucher Specimen	
Present Range in World			
Major Ecosystem and Ecological Position			
Growth Form			
Trophic Position and Ecological Role			
Sources of Information (use other side if several)			

SI-3063—12-05-74

ALIEN SPECIES IN ISLAND ECOSYSTEMS 2. Introductions

Name	Family	Animal	Plant
Island and/or archipelago			
When introduced	Deliberate?	Accidental?	
Purpose if deliberate	Established?	Yes	No
Abundant:	Common:	Occasional:	Rare: Disappeared:
Ecological Behavior			
Effects on Ecosystems			
Sources of information (use other side if several)			Voucher Specimen

SI-3064—12-05-74

F. R. Fosberg

Collection Book #23

#29473 — 30146

Book #23

#29473



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A BOORUM & PEASE PRODUCT

Jan. 25 - Honolulu
cultivated

29473 Polyscias scolopendria (Lam.) Fock.

Feb. 1 - Manoa Cliff
Trail, slopes of Mt. Tantalus
above Manoa Valley, back
of Honolulu

moist secondary forest of
acacia koa, Psidium, etc.,

3. 74 Hedysotis acuminata f.
steep slope above trail
2. 75 Gouldia terminalis
steep slope along trail
8. 76 Selaginella menziesii
common on cut bank above trail
3. 77 Cyanea
rare in dense shade

5. 78 Eupatorium ~~riparium~~
~~abundant~~ abundant on steep
slopes in thin woods

8. 79 Urera
rare in deep shade

shrub 2 m. tall, sterile;
leaves glossy, spreading,
showing every gradation
from unifoliate to pinnately
compound.

shrub 1 m. tall, ill-scented
when broken.

shrub 1.5 tall, flowers
pale green; fruit immature.

shrub, branched only
at base, stem bare,
with a large rosette
of leaves with axillary
cupules, fleshy prickles
on petioles of leaves; fruit
yellow, fleshy.
low slender densely
branched shrub;
heads pinkish white.
small tree 4 m. tall;
flowers green; fruits yellow,
clusters cauline. Latex abundant.

- 29480 *Doodia*
rare on cut bank above trail
6. 81 *Setaria palmifolia*
abundant along trail
and on slopes between
and under trees
8. 82 *Carex*
common locally on
steep slope
2. 83 *Xylocarpus*
on bark of dead stick
4. 84 *Phoradendron*
common on dead acacia tree
5. 85 *Coprosma foliosa*
rare on steep slope

Along the trail *Setaria palmifolia* is a serious weed. *Eupatorium rivularis* is abundant, much more so than *E. adenophorum* forming dense stands. *E. adenophorum* is badly attacked by a ^{stem} gall.

- ✓ ✓ 86 Feb. 1 - Roundtop, along
Roundtop Drive, above Honolulu,
Maui
3. 87 *Morus*
in bushy woods, probably

planted

culms ascending.

culms spreading,
arching.

kekahi color.

shrub 2 m. tall,
flowers ♀, greenish.

On Tantalus a slender
rhizomatous bamboo
has become very
abundant, in large
patches, excluding
almost all other
small plants and
shrubs.

widely spreading tree;
flowers green, stigmas white;
ripe fruit deep red-black,
sweet.

29487 *Lambucus*
common locally in brush

88 *Eucalyptus*
commonly planted
on slopes

Feb. 1 - Mt. Tantalus,
behind Honolulu
89 *Acacia koa*
dominant tree in much
of forest

29490
Feb. 4 - Ridge bet. Mauna
Kapu and Palikea,
southern Waianae Range,
Nanikuli - Honouliuli
moist ridge bare or
covered with bushy forest,
heads of gullies wooded.
stems of plants mossy, leaves mottled.
90 *Korthalsella cylindrica* (v. Tiegh.) Engl.
parasitic on several forms
of *Metrosideros*

91 *Exocarpus sandwicensis* Buell.
in brush at top of ridge

92 *Gouldia terminalis* var. *ovata*
in brush

93 *Youngia japonica* discarded
in shade on ridge

~~small~~ shrubs 2-3
m. tall, flowers white,
fruit deep red-purple,
fleshy.

tree 15 m. tall
with weeping habit,
very aromatic;
flowers white.

wide-spreading
tree 10 m. tall, 30 cm.
thick, flowers pale yellow.

850-900 m.

most of the higher
Waianae crests, south
of Mauna Kapu
south are reforested
with a sparse ugly
mixture of *Casuarina*,
Eucalyptus, *Grevillea*, and
Araucaria + other conifers.

stems almost terete,
~~scabrous~~ flowers in
fascicles, not whorls.
fascicles and branches
all in one plane, not decussate.
small tree 4 m. tall,
flowers greenish.

shrub 2 m. tall,
fruits blue when ripe
erect, delicate, ~~long~~
rays yellow.

- 29495 *Coprosma faurei* var. *vahuenensis*
common in brush
9. 96 *Antidesma platyphylla*
occasional in woods
4. 97 *Psilotum nudum* x *complanatum*?
edge of thicket on ridge,
terrestrial
5. 98 *Myrica faya* Ait.
around hut
6. 99 *Myrsine*
in head of gulch, common
in woods
- 29500 *Doodia*
in sparse woods
5. 01 *Psychotria*
in brushy gully head
4. 02 *Asplenium*
in brushy woods on ridge
4. 03 *Asplenium*
in brushy woods on ridge
6. 04 *Myrsine emarginata* (Rock) Hosaka
in brushy woods on ridge
1. 05 *Rumex giganteus*
in open ravine
2. 06 *Claoxycarpus bifidus*
rare in brushy ravine
1. 07 *Urera*
rare in brushy ravine

- tangled, semi-scandent
shrub; fruit immature.
- tree 6 m. tall, scraggly;
leaves glossy; fruits
juicy deep red, pleasantly
acid.
- erect, nodding at tips,
lower parts square,
to distal flattened with
thickened rounded edges.
- trees 3 m. tall, 15 cm. thick,
practically odorless;
ripe fruit red.
- tree 5 m. tall flowers ^{male}
bronzé, purple at first.
- shrub 3 m. tall, flowers
white; fruit immature.
- erect, caespitose
- low, caespitose.
- bush 1.5 m. tall;
flowers ~~are~~ purple.
- prostrate, several m.
long; flowers green.
- shrub 2.5 m. tall;
flowers greenish.
- shrub 2.5 m. tall,
latex very watery;
fruit yellow.

- 29508 *Vaccinium dentatum* Lm.
abundant on open
sparsely bushy eroded slope
- 09 *Myrsine sandwicensis* A. DC.
rare on open bushy
rocky ridge
- 10 *Bidens*
abundant in openings
- 11 *Hedyotis schlechtendahlana* f. *discolor*
common in open
bushy place
- 12 *Myrsine*
in sparse woods
- 13 *Psychotria*
in woods on steep slope
- 14 *Euphorbia*
common on ridge in brush
- 15 *Asplenium horridum*
rare on ridge
- 16 *Cupressus macrocarpa*
planted on ridge
- 17 *Hedyotis schlechtendahlana* f. *discolor*
on moist cliff
- 18 *Pelea*
on moist bushy cliff
- 19 *Korthalsella complanata*
parasitic on *Pelea* (29518)

sub-prostrate shrub,
young growth and
stems red; flowers
red with green tips
compact bush, 1 m.
tall; flowers bronze
purple; stigma white, translucent

Discarded

weak shrub; leaves
glossy.

tree 6 m. tall

small tree 6 m. tall;
ripe fruit yellow; flower
buds white.

discarded - lactiferous slender shrub,
glands maroon
erect

shrub 1.5 m. tall

low shrub, ~~flowers~~
leaves glossy green;
bracts and buds
glaucous, flowers
yellowish green, odorless.

shrub 2 m. tall,
leaves glossy;
flowers green.
joints flattened, fleshy,
readily disarticulating.

62
Feb. 4
Barber's Point

Feb. 4 - Barber's Point and
beach ~~ended~~ for ~~3~~ km.
to east, Honouliuli
open coral sand and rocks,
very dry, with Prosopis forest

29520

Pluchea odorata

common at edges of forest

4

21

Plumbago zeylanica
common

3

22

Albugo platensis

parasitic on *Boerhavia diffusa*

6

23

Cuscuta sandwicensis

parasitic on *Ipomoea pes-caprae*

7

24

Boerhavia diffusa *repens* L.
common

4

25

Ipomoea grandiflora *tuba*
local

3

26

Lycium carolinianum var. *sandwicense*
common

2

27

Atriplex

rare (1 bush seen) at edge of forest

2

28

Spergularia marina
along path, shaded.

7

29

Passiflora foetida var.

common in open disturbed
coral rock

rounded shrub 1.5 m.
tall; heads pinkish.
low spreading
suffrutescent herb;
flowers white; fruiting
calyx sticky.
infected branches of host
erect, condensed.

stems pale yellow,
flowers white, on
swollen fleshy pedicels.
prostrate, flowers
pinkish.

large vine; leaves
fleshy, with impressed
veins; flowers white.

prostrate; ~~leaves~~ leaves
fleshy, flowers pale
lavender.

gray stiff bush 0.8 m. tall,
sterile.

fleshy; flowers purple.

prostrate, ~~herbage~~ *foetida*,
flowers pale rose-purple,
corolla deeper purple at
base and apex of fila-
ments, white in center,
ovary deep green, filaments & styles pale
green, anthers yellow.

- 29530 *Lonchocarpus*
common in disturbed places
- 31 *Sisymbrium*
local in roadbed
- 32 *Lesuvium portulacastrum*
common in open
- 33 *Myoporum sandwicense* (DC.) Gray
common in forest near edge.
- 34 *Achyroanthus splendens* var. *rotundatus* H.B.K.
common at edges of forest
- 35 *Lonchocarpus*
in open

Feb. 3 - Honolulu, Iolani Palace Grounds
29490 *Polyscias scutellaria*
cultivated ornamental

Feb. 3 - Honolulu, Makiki
29536 *Polyscias scutellaria*
cultivated ornamental

Feb. 13 Honolulu, Kaimuki,
Maunalani Heights
37 *Acacia aneura* F.v.M.
cultivated ornamental

Feb. 17 Honolulu, University Campus
38 *Metrosideros*
cultivated as ornamental

39 *Odontonema*
cultivated as ornamental

erect, flowers yellow.

flowers yellow

stems reddish

prostrate; leaves
glossy, rather flattened;
flowers pink.

shrub 1.5 m. tall;
fls. pale lavender, fragrant.
gray shrub 1 m. tall

flowers yellow.

shrubs 2-4 m. tall,
leaves showing all
gradations from unifoliate
to 5-foliolate.

shrub 1.3 m. tall, sterile
leaves concave, spreading
to ascending, petioles
with one or usually
two articulations.
whitish slender shrub
2.5 m. tall

shrub 1.5 m. tall; flowers
bright red

✓✓
79540 Feb. 17 - Honolulu, Makiki
Billbergia nutans Wendl.
cultivated in pot

caespitose, leaves gray-green, striate; scapes and heads coral-crimson, spike pendent, rachis coral, ovary green, calyx coral edged with deep purplish blue, petals green, broadly margined with deep purplish blue, filaments and pistil yellowish green, anthers yellow.

✓✓ Feb. 21 - Molokai airport,
Hooilehna
weedy roadside, flat country
29541 *Verbesina encelioides*

† abundant
42 *Tricachne insularis*
occasional

5 43 *Chloris*
abundant

(40) Feb. 21 - Kualapuu
✓✓ Pineapple field with
small ravine.

7 44 *Stachys arvensis*
common on road bank
cut in decomposing volcanic rock
9 45 *Emilia javanica* (Burm.) Rob.
common on ravine sides,
roadsides, etc.

4 46 *Oxalis*
occasional in weedy ravine

5 47 *Ipomoea*
common on sides of ravine

6 48 *Digitaria*
abundant between rows
of pineapples

4 49 *Eragrostis*
abundant locally at edge
of pineapple field.

plant aromatic,
glaucous; heads yellow.
erect.

spreading at base,
then erect

flowers rose pink.

stems succulent,
flowers dull pinkish
red, appearing orange
because of orange stamens.
flowers yellow.

extensive tangled vine;
flowers pale lavender.
spikes purplish-black.

Feb

- ✓✓ ~~Feb~~ Feb. 22 - Holomua School,
1 km. s. w. of Kualapuu, Niihau. Kahanaui
roadside weeds in open
red soil.

29550 *Panicum torridum*
occasional along road

3 51 ~~Abutilon~~
~~herb 1 m. tall~~ in fence

✓✓ Feb. 22
(35) ~~Kahanaui~~ Road above
Umipaa, Niihau
weedy stony roadside

6 52 *Eragrostis*

common

2 53 ~~Gynandropsis~~ *Gynandropsis gynandra*
abundant

2 54 *Panicum torridum*
occasional.

2 55 *Panicum*
common

2 56 ~~Iponomea~~ *Iponomea* discarded
occasional

1 57 *Datura stramonium*
occasional

3 58 *Zinnia*
occasional (said to be
very abundant at other seasons)

4 59 *Eragrostis*
occasional

60

herb 1 m. tall; flowers
~~bright~~ orange-yellow.

~~another~~ plant foetid;
petals white, androgynous,
purple.

unstratate

vine; flowers white,
anthers spirally coiled.
dichotomously branched
herb 1 m. tall; fls. lavender.

erect herbs, up to
0.6 m. tall; rays dull
rusty red.
odor disagreeable

✓✓ Feb. 22 - Kualapuu

weed around yard

29560

Silene gallica L.

2 61

Gnaphalium purpureum
shaded place

62 *Coronopus didymus*

(42)

✓✓ Feb. 22 - about 2 km. w.s.w.
of Kalani, Moomomi sand
strip, directly south of
Kaa, Kaluakoi

consolidated dunes of
calcareous sand, with
occasional drifts of loose
calcareous sand.

5 63 *Richardia picroides*
eroded calcareous sandstone

10 64 *Silene gallica*
soil in cavities of eroded
calcareous sandstone

2 65 *Erodium cicutarium*
on calcareous sand

6 66 *Scaevola ^{sericea} ~~fontinalis~~ var.*
on calcareous sand and sandstone

6 67 *Nephrolepis hirsutula*
crevices and ledges on low
eroded ~~low~~ calcareous
sandstone cliff, very dry.

flowers white.

prostrate.

plant glaucous;
heads yellow.
flowers pinkish white.

rosettes flat on ground;
flowers pink.
low rounded bushes;
flowers pale ~~purplish~~
lavender, scarce at this
season; fruits white.
(from several bushes)
large colony, plants
dwarfed.

- 29568 *Anagallis arvensis*
common on calcareous sand
- 69 *Chenopodium carinatum*
one fairly large colony
on dry eroded calcareous
sandstone.

(70) Feb. 22 - N. of Puu Ula,

dry flat eroded land,
with patches of *Prosopis*
bush. volcanic soil.

- 70 *Xanthium*
dominant weed in
all eroded places
- 71 *Ipomoea*
climbing over *Prosopis*

- 72 *Portulaca*
on open eroded

- 73 *Panicum*
common in pasture
- 74 *Jacquemontia sandwicensis*
common in eroded places
- 75 *Panicum*
rare, with #29573, ²⁹⁵⁷⁸
in pasture

prostrate, flowers
orange pink, deeper
at center.

aromatic

extensive vine; flowers
white, ~~at center~~, pedicels
fleshy in fruit.
prostrate, fleshy,
leaves terete or sub-terete,
stamens about 20,
petals about 1 cm. long,
white toward base,
rose pink distally.
spreading, forming
low hummocks.
prostrate from rootstock.
flowers pale blue,
stigmas broadly linear.
possibly a hybrid,
plant not as hairy as
P. torridum, spikelets
much less so, more than #29573.

- 29576 *Lipochaeta*
#10 common in pasture
- 6 77 *Lepidium*
common in pasture
- 6 78 *Panicum*
common in pasture
- 7 79 *Panicum torridum*
abundant, principal
pasture grass
- 1 80 *Ipomoea*
on eroded spot

- (39) Feb. 22 - Kaeo cliffs
~~more~~
more or less unweathered
volcanic rock
- comp. 81 *Graphalium sandwicense*
rare on volcanic soil
- 6 82 *Panicum*
common at top of cliffs
- 6 83 *Coronopus didymus*
common locally at top of cliffs
- 3 84 *Lipochaeta*
common on talus on
ledges on cliff
- 5 85 *Lipochaeta integrifolia*
occasional on ledges on cliff
- 3 86 *Euphorbia*
occasional on ledges and
top of cliff
- 6 87 *Heteropogon contortus*
slopes just back from top of cliff

prostrate. rays
pale yellow, disk
deep dull yellow.

flowers white

prostrate

prostrate

prostrate; heads
yellow.

prostrate; leaves
fleshy; heads yellow.
prostrate, leaves
white beneath, green
above, glands green,
turning dull reddish.
prostrate (all seen
near cliffs as prostrate)

29588 *Boerhavia*
occasional

(47) Feb. 22 Anapulu

cliffs of volcanic rock
partly covered by calcareous
sand, with dunes and
flats of calcareous sand
back of them.

- 6 89 *Euphorbia degeneri*
common on sandy talus
- 2 90 *Fimbristylis cymosa*
rare on sandy talus
- 6 91 *Lycium carolinianum* var. *sandwicense*
common everywhere on cliffs
and flats at top.
- 4 92 *Digitaria henryi*
common, tending to bind
the sand.
- 4 93 *Lesquerium portulacastrum*
common everywhere

- 6 94 *Marsilea villosa*
one colony seen of a
few square yards on sand flat back of cliffs.
- 6 95 *Nama sandwicensis*
common on sand flats away from cliffs.

prostrate from
thick rootstock;
leaves white beneath;
flowers pink, stamens
1 or rarely 2 per flower.

prostrate, leaves
dull green; glands green.
caespitose, leaves stiff.

prostrate shrub;
flowers pale lavender.

prostrate

prostrate, leaves fleshy,
compressed, not erect,
no anthocyanin pigment
in plant, flowers white.
(this white form almost
exclusively here).

prostrate, flowers
rose-pink-purple, ^{tube} white

29596 *Gnaphalium sandwicense*
very local on calcareous sand

Feb. 22 - Kaeo

97 grassy *Prosopis* slopes
Pida fallax
common

98 *Emilia ~~sand~~ javanica* (Burm.) Robt.
common in open rocky eroded
(with #29599)

99 *Emilia javanica* (Burm.) Robt.
small colony growing
mixed with #29599.
Also seen together in other
parts of West Molokai

29600 *Heliotropium anomalum* var. *argenteum* Johnston

Feb. 22 - Kawaihau Pt.

flat consolidated calcareous
sand

29600 *Heliotropium anomalum* var. *argenteum*
local, only seen here
at point.

same
same

02 *Portulaca lutea*
local near point

03 *Euphorbia seguierii*
common everywhere

heads yellow, plant
white.

100 m.

shrub
prostrate; flowers
orange, center not
at all red.

flowers ~~dark~~ thin
~~pinkish~~ red, stamens
orange.

flowers magenta-crimson
stamens ~~not~~ also.

Johnston

50 m.

Johnston. prostrate, flowers
white with prominent
yellow eye, fragrant.
same, yellow eye very
small.

prostrate, very fleshy,
flowers yellow, 2 cm.
across, stamens 40-50,
stigmatal lobes 6.

prostrate, leaves gray;
glands green.

29604 *Heliotropium curassavicum*
occasional

05 *Chenopodium vavilense* Mey.
local on extreme point
on flat limestone

06 *Panicum*
common

~~leaves~~ prostrate
leaves thinly fleshy,
glaucous, flowers
white with green eye.
very prostrate
shrub, branches
~~are~~ 1 m. or more long.
prostrate

(46)

Feb. 23 - Moonomi Beach

extensive dunes of calcareous sand, with strips of *Prosopis* in hollows.

Scaevola frutescens s. sericea abundant. *Lesbania tomentosa* common, but many more and larger plants dead. Most mats not over 2 m. across. *Nama sandwicensis* and *Grapphalium sandwicense* common. plenty of seedlings of *Grapphalium*. *Jacquemontia sandwicensis* and *Rida fallax* very common everywhere, also *Heliotropium anomalum*, *Lesuvium portulacastrum* both white and pink flowered forms.

Portulaca oleracea and *P. lutea* both present, the former much more common. A series of plants noted that seem to be hybrids between the two. In habit, breadth of leaves, and number of stamens they are intermediate, as well as in flower size and lobing of petals. The *P. oleracea* has about 6-8 stamens, the *P. lutea*

40-50, the hybrids 18-20 ±. A mass collection

The of fruiting twigs taken at random, one from a plant was made to study the seeds.

Solanum nelsoni very common. The leaf shape is uniformly cordate. The size varies somewhat, as does petiole length and width of basal sinus. No lobing seen on any of plants.

- 29607 *Boerhaavia*
 " flat eroded volcanic soil
 back of dunes
- 43 08 *Sesbania tomentosa*
 slopes of dunes, common
- 6 09 *Solanum nelsoni*
 common on dunes
- 2 10 *Solanum nelsoni*
 common on dunes
- 6 11 *Solanum nelsoni*
 common on dunes
- 2 12 *Lonchocarpus*
 common on dunes
- 2 13 *Emilia javanica*
 common in hollows between
 dunes
- 4 14 *Nama sandwicensis*
 common on dunes

prostrate, leaves
 pallid beneath;
 flowers pink; stamens
 2 (rarely 3).

prostrate, stems
 up to 1 m. or more
 long, old ones woody;
 flowers bright brick red.

prostrate, forming
 loose mats, flowers
 lavender, ~~stamens~~ ^{anthers} purple,
 strongly curved, tips
 pointing inward but
 not connivent; fruit
 black and very bitter
 when ripe, borne mostly
 beneath leaves.

mass collection of
 one leaf, selected as a
 mature leaf, as ~~so~~ strongly
 lobed as seen on plant,
 from plants selected at
 random. From population
 represented by #29609 + 29611.
 (as in #29609) but fruits
 immature.

erect; rays pale yellow.

flowers bright red.

prostrate, flowers
 rose ~~pink~~ purple, with
 pale yellowish tube.

- 2 29615 *Portulaca* (hybrid swarm)
hollow in sand dunes,
~~between~~ in a space not
more than 50 ft. square.
- 2 16 *Portulaca lutea*
same
- 2 17 *Portulaca oleracea*
same
- 4 18 *Portulaca lutea* x *oleracea*
same
- 2 19 *Gnaphalium sandwicense*
common locally on dunes

~~Har. Har.~~

Feb. 23 - Kualapuu

20 *Calliandra*
cultivated ornamentals

with
29614
29617
29618

mass collection of
fruiting twig from each
of many plants
taken at random.

prostrate, very fleshy,
flowers yellow, 2 cm.
across, stamens about 40-50,
pistil longer, subequal with
petals, stigmas 6. ^{petals} scarcely notched

prostrate, fleshy;
flowers yellow, less than
1 cm. across, petals deeply
~~not~~ notched, stamens 6-8.

prostrate, fleshy,
flowers yellow, 1.5 cm.
across, petals deeply
notched, stamens about
20, stigma lobes 5.

plant white, heads
yellow.

spreading shrub
branches rising at
about 45° angle from
base; stamens white
with rose distal third.

Feb. 23 - West O'hia
between Kamalo and Pukoo
near seashore

Weedy bushy roadside

- 29621 *Ocimum gratissimum* L.
abundant throughout
lowland area

- 4 22 *Abutilon*
common, forming
low thickets

- 4 23 *Euphorbia heterophylla*
common in edges of thickets

Feb. 23 - just west of
Kamalo, along seacoast
roadsides and salt
flats

- 4 24 *Sida fallax* Walp.
common in dry stony
places

- 5 25 *Ocimum basilicum*
occasional in loose
crushed lava along road
embankment.

- 4 26 *Pluchea indica*
abundant on salt flats

- 4 27 *Nicotiana glauca*
occasional along road

2 m.

aromatic, flowers
greenish white.

suffrutescent herbs
~~1-1.5~~ 1-1.5 m. tall, flowers
orange.

herb 1 m. tall, bases
of inflorescence bracts
scarlet; gland green.

1-2 m.

shrub up to 7 m. tall,
flowers orange,
slightly marked
with red in center.

pleasantly aromatic;
flowers white with
purple calyx.

low shrubs 1 m. tall;
heads pinkish.

shrubs 2-3 m. tall;
leaves glaucous;
flowers yellow.

Feb. 28 - Kaloko, 2 km.
s.w. of Makapuu Head
beach flats of coral
sand.

29628 *Chenopodium murale*
very common on roadsides
back of beach

29 *Dactyloctenium aegyptium*
common on upper beach

30 *Albugo platensis*
common on *Boerhavia diffusa*

30a *Boerhavia diffusa*
31 *Lonchus oleraceus* L.
common on sand

32 *Euphorbia degeneri* Steiff
common on high sand
ridge bound by *Sporobolus virginicus*

33 *Reichardia*
common on sand

Feb. 29 - lower slopes 3 km.
e. of Puu Kana, Honouliuli
old pineapple field

34 *Pennisetum*
abundant

Feb. 29 - gulch north of
Ekahanni Gulch, n.e. slope
of Puu Kana, Honouliuli

35 *Dodonaea*
common in moist wooded gulch

herb, much branched
from base, plant
somewhat mealy,
flowers reddish green.
spreading depressed
tufts.
changes habit of
plant by shortening
internodes.
erect, up to 0.3 m.
tall; rays pale yellow.
prostrate, leaves in
vertical plane; glands
green.
glaucous; flowers
bright yellow.

loose tufts; spikes
reddish, nodding.

small bushy tree,
flowers dark red

✓ Feb. 29 - Puu Kaea, Waianae Range, Honolulu (and boundary with Lualualei)

Wet brushy woods on crest and steep slope.

29636 *Phytolacca sandwicensis* Endl.
common about crest and just below.

3 37 *Gouldia terminalis* f.
low brushy woods on crest

6 38 *Gleichenia linearis* var. *tomentosa*
tangled mass on crest

✓ Feb. 29 - Ekahanni Gulch, E. slope Puu Kaea, Honolulu
~~moist~~ moist wooded gulch

7 39 *Pouteria*
gulch bottom

3 40 *Carex bunnea*
steep brushy ridge

2 41 *Coprosma faurei*
occasional in brushy woods

6 42 *Carex wahuensis*
common on steep ridge

1000 m.

spawling herb,
flowers rose pink;
fruits immature,
greenish, black.

shrub 2 m. tall,
flowers green.

rhizomes prostrate,
slightly buried, leaves
forming a tangle.

large spreading tree,
fruits mostly about
1/4 grown, when nearly
mature 3 cm. diam.
loose spreading
clump.

750 m.

Do 700 m.

850 m.

tangled shrub, fruit
yellow, rare.

tufts; fruits yellow
when ripe.

- ✓✓ Mar. 1 - Maunalanui Heights, Kaimuki, ridge east of Palolo Valley
 29643 *Emilia javanica* (Burm.) Rob.
 weed in garden
- ✓✓ 44 *Polyscias scutellaria*
 cultivated as hedge
- ✓✓ Mar. 1 - bluffs on east side of entrance to Palolo Valley, Kaimuki, Honolulu
- 5 45 *Callisia fragrans* (Lindl.) Woods
 abundant, forming large patches.
- ✓✓ Mar. 1 - Honolulu, Kalakaua Ave. + Young St.
 cultivated
- 4 46 *Artocarpus heterophylla*
- 5 47 *Pouteria zapodilla*
- ✓✓ Mar. 6 - Honolulu, University, Manoa stream
- 6 48 *Senecio*
 cultivated ornamental.
- 3 49 *Discliptera chinensis*
 weed in ravine of stream, in shade, common.

flowers pale brick red
 one plant flowering,
 flowers greenish white.

~~st~~ stem prostrate
 with ascending tip,
~~fls~~ spreading by
 stolons; flowers white.

tree 10 m. tall, lactiferous.
 tree 10 m. tall, ~~flowers~~
 lactiferous; flowers
 white; fruit brown,
 not mature.

climbing vine, disk
 yellow, rays orange,
 becoming orange-red
 with age.
 weals sprawling
 herb.

29650 *Hypsis pectinata*
5. weedy waste place

(70)

Mar. 7 - Koko Head
weedy roadside on
~~lava~~ beds of tuff,
Prosopis forest

- 3 51 *Crotalaria incana*
common locally
- 3 52 *Commelina benghalensis*
common generally
- 3 53 *Ocimum gratissimum* L.
very common generally
- 3 54 *Desmanthus virgatus*
large dense colony
- 2 55 *Emilia javanica*
scattered, depauperate,
on open dry slope
- 3 56 *Medicago denticulata*
local
~~occasional~~ on open slope
- 2 57 *Dodonaea viscosa*
one plant seen on exposed
ridge near summit
- 2 58 *Digitaria*
open cinder slope
- 6 59 *Panicum torridum*
common ~~in~~ in somewhat
protected places

bushy herb, up to
0.8 m. tall; flowers
whitish

100 m.

erect; flowers yellow.

prostrate, rooting
at nodes; flowers
purple, collapsed
by afternoon.

shrub 4 dm. tall,
aromatic (others much
larger); flowers
greenish.

stems ascending;
flowers white.
heads ^{red} magenta.

prostrate; flowers
yellow, fruits ~~at~~ along
lower side of stem.
low compact spreading
bush, 3 dm. tall.

200 m.

150 m.

many patches seen
much ~~than~~ taller
than this.

246 60 *Abutilon incanum*
steep eroded tuff slope

61 ~~*Emilia javanica*~~

same - meadow in floor
of crater, dominated by *Echinocloa*

4 61 *Emilia javanica*
occasional

4 62 *Marsilea villosa*
forming dense turf locally

same - eroded crater
of tuff cone

4 63 *Panicum*
common on much
eroded ~~area~~ flat area
almost bare of vegetation

6 64 *Eragrostis*
common locally on steep
crater wall

3 65 *Lepidium*
local on bare eroded place

vv March 14 - Honolulu, Makiki
in garden

2 66 *Lactuca sativa*
cultivated for food

4 67 *Gaillardia*
cultivated for ornament

4 68 *Youngia japonica* ssp. *typica*
spontaneous

5 69 *Youngia japonica* ssp. *elstonii*

small branched
shrub up to 0.7 m. tall;
flowers ^{dull} whitish pink
with ~~deep red~~ ^{maroon} center.

75 m. ^{*Marsilea villosa*} column, *Trachne insularis* and
flowers reddish
magenta pink.

prostrate, spreading.

densely caespitose

flowers yellow.

bushy, much-branched;
rays deep dull red with
yellow tips.
rays yellow.

scape fistulose; rays yellow.

29670 *Youngia japonica*
spontaneous

(65)
✓✓

March 14, 1948 - Makapuu
Head, east point of Oahu
dry slopes of lava and
scoria, covered mainly
by *Prosopis*.

- 2 71 *Digitaria henryi*
common on ledges and
along trail on cliffs
- 4 72 *Panicum*
abundant ~~locally~~ on
ledges at top of cliffs
- 6 73 *Panicum*
abundant locally on
ledges at top of cliffs
- 4 74 *Lipochaeta integrifolia*
very common on high
eroded slopes above
sea cliffs.
- 7 75 *Panicum*
common on dry high
eroded slopes
- 3 76 *Lipochaeta*
common on dry brushy
west slope
- 3 77 *Lipochaeta*
same

plants of comparable
size of the two subspecies
growing side by side
to show comparative
~~stature, etc.~~ habit, etc.

50-150 m.

prostrate.

~~anthers~~ plants
prostrate, anthers
range.
ascending; anthers
range.

prostrate, forming
mats; leaves succulent
with green veins
beneath; heads yellow.
prostrate twisted
spreading plants.

weak shrub 0.5 m.
tall; flowers yellow.

same

- 29678 *Ipomoea cairica*
common on rocky dry
west slope of lava boulders
- 5 79 *Echinochloa*
occasional on dry west
slope of lava boulders
- 5 80 *Abutilon incanum*
abundant on dry west
slope
- 9 81 *Sida fallax*
abundant everywhere
- 3 82 *Lipochaeta*
common on ^{dry} west slope
- 1 83 *Asystasia gangetica*
rare on dry bushy slope

March 19 Ridge east of
Makaiwa Gulch, lower
slopes of extreme south
end of Waianae Mts.
Dry rocky slope covered
with *Prosopis*

- 3 84 *Sida fallax* Walp.
common everywhere (with
29678)

- 6 85 *Sida fallax* Walp.
common everywhere
(with 29684)

- 3 86 *Eragrostis*
common along road

- 3 87
universally parasitic on *Abutilon*

extensive vine, flowers
pale lavender, corolla
purple, stamens unequal.
spreading

low branched bush
0.5 m. tall, flowers
dull pale pink with
maroon center.
shrub 0.5 m. tall,
flowers orange
subprostrate shrub,
flowers yellow
spreading herb,
flowers white.

~~shrub~~ shrub 0.5 m. tall;
calyx green corolla
orange, scarcely a
trace of red on claws.
shrub 0.5 m. tall;
calyx ^{male} maroon, corolla
orange with scarcely a trace of red
at base.

incanum but not on *Sida fallax* or
Gossypium tomentosum.

29688 *Abutilon incanum*
common everywhere

89 *Desmanthus virgatus* (L.) Willd.
locally common along roadside.

90 *Gossypium tomentosum*
local along roadside
at edge of *Prosopis* forest

March 19, 1948 - Barber's Point
flats of coral rock
and sand, with
scattered brush and
backed by *Prosopis* forest
with undergrowth
of *Achyranthes splendens*.

91 *Mysporum sandwicense*
common

stamens 5, in occasional flowers

or 1 larger than others; fruit a whitened

92 same

shrub 0.5 m. tall;
flowers dull pale pink
with maroon center.

~~to~~ dense growth ~~at~~
~~in forest~~, semi-
decumbent, flowers
white.

spreading diffuse
gray shrub.

Honolulu

rounded bushes
up to 1.5 m. tall,
flowers from white
to well marked
with purple.

mass collection of a
flowering twig from
each of many plants
taken at random, to
show variation
in leaf shape, number
of stamens, etc.

~~Mar.~~ Mar. 19 - coast 2 km.
east of Barber's Point,
Honolulu

flats of coral rock and
sand, backed by
dense *Prosopis* forest

29693 *Achyranthes splendens*
local, in open on coral
rock.

94 *Myoporum sandwicense*
occasional ~~along~~

Mar. 19 - Ewa Coral Plain
3 km. e. of Barber's Point
Honolulu

Open *Prosopis* forest on

95 *Plumbago zeylanica* L.
occasional in semi-
shade.

16 96 *Sicyos*
dominant under-growth
climbing over bushes,
fences, etc. and covering
all open ground, both
under trees and in
openings

shrub 1 m. tall,
much-branched.

mass collection to
show variation in no.
of stamens and shape
of leaves. Flowers from
white to strongly
marked with purple.

flat of coral rock.

semi-prostrate
suffrutescent herb; flowers
white.

herbaceous vine.
leaves from scarcely
lobed to palmatisect;
flowers white.

✓✓ March 20 - Honolulu, Manoa
(University Campus)
cultivated ornamentals

29697 *Plumbago auriculata* Lam.

5 98 *Callistemon speciosa*

5 99 *Thunbergia erecta*

(39) ✓ March 21 Maakua - Papali
Ridge, Hanalei

Open rocky ridge with
scattered brush

29700 *Psilotum nudum* (L.) Giseb.
9 common along ridge

5 01 *Korthalsella*
common locally, parasitic
on *Diospyros* in lower woods

3 02 *Psychotria* (Hauk) (Hauk)
common in lower forest

10 03 *Bidens magnadiaca*
discarded common locally on ridge
at lower edge of forest

7 04 *Osteomeles anthyllidifolia*
occasional on ridge
just at lower edge of forest.

rounded shrub, ^{2 m. tall} flowers
pale bluish.
slender tree 5 m. tall
with drooping branches.
stamens crimson.
shrub 1.5 m. tall,
calyx greenish white,
corolla tubular and most
of throat pale yellow,
limb deep purple.

150 m. branchlets triangular

250 m. stems terete, green,
flowers in complete
whorls, branches not
in one plane.

250 m. small tree or shrub,
flowers white.

200 m. main stem erect, sterile,
one lateral branch
greatly elongate,
paniculate with
loosely flowered yellow heads.

200 m. prostrate shrub; flowers
white.

- 29705 *Stachytarpheta urticifolia*?
 2 very common weed below
 and at lower edge of forest
 06 *Laevola gaudichaudiana*
 occasional at lower edge
 of forest.

- ① Mar. 21 - Papali gulch, near
 head, Hamula
 07 Wet gulch
 5 07 *Dryopteris*
 bottom of gulch, common
 2 08 *Dryopteris*
 bottom of gulch, rare
 7 09 *Dryopteris*
 bottom of gulch, common
 5 10 *Nothocestrum elongifolium*
 wet woods on side of gulch.

- 7 11 *Psilotum*
 rare epiphyte in wet woods
 on wall of gulch.

- ① March 21 - high ridge at
 east of head of Papali
 gulch, Hamula
 wet scrubby forest on ridge
 top, densely overgrown
 with *Gleichenia*.

- 200 m. shrub 1 m. tall;
 flowers deep rich purple.
 rounded shrub 1.5 m.
 tall, ~~flat~~ leaves a
 slightly bluish green.
 flowers white; fruit
 black.

ping

ted,
 ing
 tate.

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 m. tall,
 inal

~~then~~
 flowers
 pale
 nge.

PLANTS OF THE HAWAIIAN IS.

OAHU

Nothocestrum longifolium

Locality Papali Gulch, near head,
Koolau Mts., Hauula

Occurrence in wet woods
on side of gulch.

Date Mar. 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29710

Remarks slender tree 4 m. tall; leaves
in terminal pseudo-rosettes, these
flattened; corolla pale
greenish-orange.

4

PLANTS OF THE HAWAIIAN IS.

OAHU

Nothocestrum longifolium

Locality Papali Gulch, near head, Koolau Mts.,
Hauula

Occurrence In wet woods on side of gulch

Date March 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29710

Remarks Slender tree 4 m. tall; leaves in
terminal pseudo-rosettes, these
flattened; corolla pale greenish-
orange

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Remarks Slender tree 4 m. tall; leaves in
terminal pseudo-rosettes, these
flattened; corolla pale greenish-
orange

PLANTS OF THE HAWAIIAN IS.

OAHU

Psilotum

Locality Papali Gulch, near head,
Koolau Mts., Hauula

Occurrence rare epiphyte in
wet woods on wall of gulch.

Date Mar. 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29711

Remarks

1

PLANTS OF THE HAWAIIAN IS.

OAHU

Nothocestrum longifolium

Locality Papali Gulch, near head, Koolau Mts.,
Hauula

Occurrence In wet woods on side of gulch

Date March 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29710

Remarks Slender tree 4 m. tall; leaves in
terminal pseudo-rosettes, these
flattened; corolla pale greenish-
orange

PLANTS OF THE HAWAIIAN IS.

OAHU

Psilotum

Locality Papali Gulch, near head, Koolau Mts.,
Hauula

Occurrence Rare epiphyte in wet woods on wall
of gulch

Date March 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29711

Remarks

PLANTS OF THE HAWAIIAN IS.

OAHU

Nothocestrum longifolium

Locality Papali Gulch, near head, Koolau Mts.,
Hauula

Occurrence In wet woods on side of gulch

Date March 21, 1948 Alt. m

Coll. F. R. Fosberg No. 29710

Remarks Slender tree 4 m. tall; leaves in
terminal pseudo-rosettes, these
flattened; corolla pale greenish-
orange

- 29705 *Stachy tarpheta urticifolia*?
 2 very common weed below
 and at lower edge of forest
 06 *Laevola gaudichaudiana*
 occasional at lower edge
 of forest.

- ① Mar. 21 - Papali gulch, near
 head, Hamula
 07 *Dryopteris*
 5 bottom of gulch, common
 08 *Dryopteris*
 2 bottom of gulch, rare
 09 *Dryopteris*
 3 bottom of gulch, common
 10 *Nothocestrum glangifolium*
 wet woods on side of gulch

- 11 *Psilotum*
 rare epiphyte in wet woods
 on wall of gulch.

- ① March 21 - high ridge at
 east of head of Papali
 gulch, Hamula
 wet scrubby forest on ridge
 top, densely overgrown
 with *Gleichenia*.

- 200 m. shrub 1 m. tall;
 flowers deep rich purple.
 " rounded shrub 1.5 m.
 tall, ~~flat~~ leaves a
 slightly bluish green.
 flowers white; fruit
 very small, black.

1500 m.

rootstock creeping

rootstock congested,
 somewhat creeping
 rhizome prostrate.
 congested, heavy.

1550 m.

slender tree 4 m. tall,
 leaves in terminal
 pseudoraceme, ~~these~~
 these flattened; flowers
 with corolla pale
 greenish orange.

1550 m.

29712

Exocarpos
one plant seen.

11

13 *Leaevola glabra*

occasional

14 *Pittosporum*

one seen

15 *Psychotria* (Straussii)
common, mostly not
yet out.

March 21 -

Heeia Bridge, Heeia
mangrove swamp

16 *Bruguiera parviflora*
rare

March 24 - Kaneohe ~~Coast~~ ^{School}
Kaneohe

8

17 *Terminalia*
cultivated ornamental

March 24 Kailua Beach,
Kailua

18 *Sporobolus virginicus*
forming dense turf at top of beach

shrub 1.5 m. tall,
7 cm thick at base,
flowers green, expanded
leaves scarce, branchlets
terete - appearance like
Rhipsalis.

shrub 1 m. tall; flowers
chrome yellow.

shrub 2.5 m. tall,
sparsely branched;

flowers white ~~with~~
rather unpleasantly
fragrant, odor.

small tree 4 m. tall,
buds white.

tree 4 m. tall; flowers
greenish white; petals
with brown marks
distally.

tree 12 m. tall, leaves
somewhat glaucous
beneath.

- 29719 *Paspalum vaginatum*
forming dense sod at
margin of brackish
estuary.
- ✓✓ March 24 - Kawaiinui
Swamp, Kailua
- 20 *Wolffia columbiana* ^{Karst.} ~~floating~~
common locally in
shallow water among
partially submerged
Paspalum vaginatum.
- 21 *Emilia javanica* (Burm.) Rob.
common with #29722, 29723.
- 22 *Emilia javanica*
common with #29722, 29723
- 23 *Emilia javanica*
~~common~~ rare, with #29721, 29722
- ✓✓ March 24 - Kailua, Kailua
- 24 *Trema ambuinensis*
planted as ornamental
- ✓✓ March 24 - Honolulu
base of Punchbowl.
- weedy roadside
- 25 *Crotalaria spectabilis*
abundant but very local
- 26 *Desmodium*
common but local

upper leaf surface glabrous,
a few weak hairs at
auricles.

upper surface convex,
thalli occasionally
budding at ends.

flowers magenta.

flowers pale brick red.

flowers orange-red.

Tree 10 m. tall, 30 cm. thick

flowers bright yellow
inside, brown striate
at base of standard,
purplish bronze outside,
erect; flowers greenish.

March 26 - e. side of ridge
bet. Mauna Kape and Puu
Palikea, along Kaaiukukai - Palawai Ridge

dry ridge with sparse
scrubby forest, mainly
Metrosideros

29727 *Hedyotis schlechtendaliana*
common on steep wooded
slope

28 *Hedyotis schlechtendaliana*
same

29 *Asplenium*
rare in deep shade, terrestrial,
on steep wooded slope

30 *Claphoglossum*
common on steep wooded
slope

31 *Peperomia*
rare in deep shade on
steep wooded slope

32 *Pittosporum*
rare on steep wooded
slope

33 *Metrosideros*
abundant, dominant
plant.

weak shrub 1 m. tall,
diffusely branched,
flowers pistillate + ♂
extreme variations in
size even in same
inflorescence.
same ♀, flowers ~~not~~
essentially uniform.

fleshy, leaves maroon-
purple beneath, with
white veins
shrub 3 m. tall,
much branched.

mass collection of a
twig with ripe fruit
from each of many
trees ~~at~~ selected at
random - shows
variation in leaf size, shape,
pubescence, fruit size, pubescence.

- 29734 *Metrosideros*
 3 35 "
 3 36 "
 3 37 "
 3 38 "
 same
 5 39 *Asplenium*
 occasional near top of
 ridge in shade
 7 40 *Trema*
 rare in dry forest
 on slope
 5 41 *Santalum fraxinetianum* Jaud.
 common in open forest
 C 42 *Panicum*
 common in sparse forest
 on steep slope
 5 43 *Psychotria (Stransea)*
 in ~~the~~ sparse forest on
 steep slope
 C 44 *Acacia kora*
 abundant on slopes
 2 45 *Stellaria media*
 common on open ridge top
 2 46 *Graphalium purpureum*
 common on open ridge top
 1 47 *Psilatum nudum*
 rare on open eroded ridge top.
 2 48 *Polypodium*
 common on mossy ledges
 in open

gnarled shrubby trees
 stamens red - to go
 with mass coll. 29733

tree 6 m. tall

tree 5 m. tall, leaves
 glossy above, dull beneath,
 flowers dark red without,
 cream within turning
 dark red with age.
 culms semi-prostrate,
 panicle deep purple-maroon.

small tree

spreading tree 4 m. tall,
 flowers pale yellow.
 flowers white

fronds erect.

- 49 *Doryopteris*
mossy ledges and
shady spots on ridge
- 50 *Agrostis retrofracta*
common in open places on ridge
- 51 *Gracilium*
common in open places on ridge
- 52 *Eragrostis grandis*
common on open ridge
- 53 *Psilotum*
epiphytic ^{near} base of *Metrosideros* trunk
- 54 *Ilex anomala*
common in sparse forest on slope
- 55 *Psychotria (Straussia)*
common in sparse forest on slope
- 56 *Pelea*
occasional in sparse forest
on slope.
- 57 *Fuzula*
common on mossy banks and
slopes
- 58 *Cyperus*
local on bare eroded ridge
- 59 *Exocarpos*
local on bushy ridge
- 60 *Mysine sandwicensis*
common on bushy ridge
- 61 *Ceractium vulgatum*
rare on open ridge
- 62 *Peperomia liliifolia*
thickly wooded slope, in bush
- 63 *Delaginella menziesii*
shade on thickly wooded slope

erect

caespitose

caespitose.

tree 5 m. tall.

♂ flowers white.

shrub 3 m. tall, flowers

white.

tree 4 m. tall, aromatic;
flowers pale green.

tufts

tufts

shrub 2 m. tall,
spreading, no expanded
leaves, flowers greenish
yellow.shrub 2 m. tall,
fruit immature.

erect, green.

March 27 - Cliffs at
head of Nanikuli Valley
Between Maana Kapu and
Palikua (Central Nanikuli Gulches)

- 29764 *Acacia dealbata*
planted for reforestation
just below crest.
- 65 *Urera glabra*
local in bottom of
steep gulch
- 66 *Pouteria*
common in sparse woods
on steep slope.
- 67 *Euphorbia*
common in undergrowth
- 68 *Claoxylon*
small colony
- 69 *St. diegoi*
occasional in underbrush
in sparse woods.
- 70 *Coprosma longifolia*
common in sparse woods
on steep slopes in gulches.
- 71 *Pelea*
common in sparse woods
on steep slope
- 72 *Pseudomorus brunoniana*
rare in open on steep slope
- 73 *Desmodium cinnamatum*
common on open slopes
- 74 *Urera kaala*
occasional in bottom
of steep gulch

sparsely
wooded basalt cliffs and
steep slopes with openings
filled with *Bidens*, *Eupatorium* and *Pentstemon*.

bushy tree 4 m. tall,
flowers pale yellow,
fragrant.

sterile tree 5 m. tall

tree 6 m. tall, lactiferous,

stems arching, lactiferous,
glands black - purple.
small tree 4 m. tall,
fruit green
vine several m. long,
flowers white.

small tree 4 m. tall, pale green.

tree 5 m. tall

small tree 4 m. tall,
sterile, apparently dying.
aerial herb; flowers
pinkish white.
small diffuse trees,
monocious, two kinds
of flowers on different
twigs.

- 29775 *Myrsine*
one thickset seen in steep gulch
- 76 *Dipturus*
common in bottom of steep gulch
- 77 *Artemisia*
rare on rocky ledges on cliffs
- 78 *Cherpentiera obovata*
common on steep, wooded slopes
- 79 *Hedyotis acuminata*
not common on steep, woody slopes
- 80 *Rumex albenscent*
occasional in openings
- 81 *Asplenium*
rare in brush
- 82 *Myrsine*
~~occasional~~ in sparse woods
- 83 *Psychotria (Straussia)*
common in sparse woods
- 84 *Gardenia remyi*
rare in sparse woods
- 85 *Microlepia*
very common in woods, terrestrial
- 86 *Pteris*
very local in undergrowth
- 87 *Cardamine*
rare in ~~the~~ moist place

- Many small trees up to 4 m. tall, young growth reddish, fruit bluish black.
- small rounded bushy tree 4 m. tall, leaves bright yellow-green above, bluish green beneath, fruit white, fleshy.
- shrub 0.7 m. tall.
- shrub 2 m. tall, panicles red, pendent.
- slender shrub, up to 2.5 m. tall, foetid when broken; flowers green.
- vine-like, up to 2 m. long.
- rhizome thick, prostrate
- tree 5 m. tall, with drooping branches; fruit immature.
- tree 6 m. tall, flowers white, rotate, fruit immature.
- sterile shrub 3 m. tall.
- fronds brittle

- 29728 *Lycyox*
climbing over great rocks.
- 5 89 *Psychotria* (Straussia)
common in woods
- 2 90 *Polypodium*
epiphytic on tree trunk
- 7 91 *Pouteria*
occasional in woods
- 4 92 *Psychotria* (Straussia)
common in woods
- 5 93 *Pilea*
common in woods
- 6 94 *Pilea peplodes*
common on steep bare place
- 3 95 *Cyperus*
occasional on loose earth
- 5 96 *Doryopteris decipiens*
common on steep, brushy slope
- 5 97 *Asplenium*
common on steep, brushy slope
- 5 98 *Phyllanthus sandwicensis*
~~local~~ abundant locally
on crest of cliffs in ^{low} woods
- 2 99 *Viola trachelifolia*
occasional at crest of
cliff in low woods.

March 27 east slope of
ridge between Mauna
Kapua and Puu Palikea, South

- 29800 *Asplenium*
thick woods on slope

- 29799a *Eugenia sandwicensis*
occasional in sparsely wooded slope

wine several m long,
flowers white.
tree 6 m. tall; flowers
white, rotate.

tree 7 m. tall, spreading.

small tree, flowers
white.

tree 5 m. tall, flowers
pale green, fruit green.
stems fleshy,
translucent.

slender shrub, up
to 1 m. long, ascending;
flowers bronze pink.
erect shrub, up to
0.5 dm. tall; flowers
white.

Palawai gulch

tree 3 m. tall, spreading,
fruit reddish when ripe.

1948 Haw. Is.

same - March 28 steep densely wooded slope

- 29801 *Coprosma faurei*
common in bushy woods
- 02 *Coprosma foliosa*
rare in sparse brush on ridge
- 03 *Hedyotis acuminata*
occasional, climbing into trees
- 04 *Coprosma faurei*
common, climbing into trees
- 05 *Pouteria*
occasional
- 06 *Pseudomorus hunniana*
rare
- 07 *Gouldia terminalis* var. *kaala* f.
occasional
- 08 *Zanthoxylum dipetalum*
rare (one seen) on face of cliff
- 09 *Pelea clusiaefolia*
occasional
- 10 *Asplenium*
occasional, local, terrestrial
- 11 *Diospyros hillebrandii*
occasional

- sterile semi-scandent shrub.
- shrub 2 m. tall, diffuse, sterile.
- slender semi-scandent shrub up to 4-5 m. long, foetid when broken.
- semi-scandent shrub; ♀, fruit immature.
- small spreading tree, lactiferous; fruit purple.
- tree 3 m. tall, sterile; leaves conspicuously white-venulose.
- tree 10 m. tall, 2.5 dm. thick, bark ~~pink~~ rose-pink; flowers green; ripe fruit blue-black.
- small tree 2.5 m. tall; leaves stiff, plane, varying from unifoliate to fully 5-foliate, often 2 lowest leaflets reduced; petals fused in 2's, fleshy, bronze green.
- small tree 4 m. tall; leaves very glossy, revolute; buds green.
- plant ~~rosette-like~~ rosette-like.
- small bushy gnarled tree 4 m. tall; leaves dark green, reticulate, young growth red; fruit immature.

- 29812 *Asplenium horridum*
common
- 5- 13 *Korthalsella*
common, parasitic on
Elaeocarpus bifidus
- 6 14 *Hedyotis schlechtendahlana* f.
common in undergrowth.
- 2 15 *Psychotria (Straussia)*
common
- 6 16 *Dissochordus biflorus* (Hb.) Ktze.
large colony on very
steep slope in opening
- 7 17 *Lehriedea*
occasional in undergrowth
- 3 18 *Korthalsella*
common locally, parasitic on
Antidesma platyphylla
- 1 19 *Psychotria (Straussia)*
common
- 5 20 *Lysimachia*
very local, one small colony
seen in undergrowth

fronds almost erect,
dark green, brittle.

dichotoma plant a slender shrub
up to 1 m. tall, arching;
inflorescence glaucous;
flowers yellow-green, ♂.
(calyx lobes a bit too long,
appr. var. *cordata*).
shrub 1.5 m. tall;
flowers white, buds
with tips of lobes
slightly separated,
thickened.
culms ~~for~~ spreading
to ascending.

elongate, vine-like,
tangled in bushes,
leaves purplish green,
midribs purple; perianth
purple, stamens white.
plants dark green, glossy,
& joints longitudinally
ribbed.

shrub 2 m. tall; fruit
yellow when ripe.
vine-like shrub,
pubescence coppery; corolla
maroon at base, ^{lobes} bronze, veined
with maroon, not opening wide,
~~small~~ calyx somehow getting inside
corolla tube in age, strongly twisted at falling of cone.

29821 *Psychotria (Straussia)*
common

2 22 *Merandia*
occasional

3 23 *Gleichenia*
abundant locally on
steep slopes, mostly
in open or brushy places.

2 24 *Hedyotis acuminata* f. *grayana*
occasional in undergrowth

1 25 *Hedyotis acuminata* f. *grayana*
rare in undergrowth.

3 26 *Asplenium*
common, terrestrial in deep
shade.

27 *Pittosporum glabrum* var. *intermedium*
rare, in shade

28 *Vaccinium*
common on steep brushy ridge

29 *Artemisia*
common locally on steep
brushy ridge (suggesting that
ridge must have been more denuded

small tree 4 m. tall,
flowers white, buds with
tips of lobes thickened and
slightly separated.

vine climbing 5 m.
up into tree, stems,
~~petioles~~ leaves glossy,
petiole and main veins
brownish red.

forming tangles.

slender shrub 1 m. tall,
~~foetid when broken;~~
flowers yellow-green.
(leaves too broad, calyx lobes
too broad for f. *grayana*.)

simple shrub 1 m. tall,
foetid when broken. (leaves
too broad for f. *grayana*).
dark green

shrub with elongate
twisted branches; flowers
white.

slender shrub 1 - 1.5 m.
tall, young growth red;
flowers deep coral red
with green tips.

shrub 0.8 m. tall, aromatic.

formerly).

March 28 - ridge bet.
Palikea and Mauna Kapu,
head of South Kaaibukai Gulch,
Honouliuli-Nanikuli
rocky ridge with
low bushy woods.

29830 *Dianella sandwicensis*
in shelter of great rocks
under small trees, small
colony

5 31 *Gahnia*
same

2 32 *Psilotum* int. bet. *nudum* & *complanatum* var.
terrestrial on ridge between
rocks

✓✓ March 28 Kaloi Gulch,
Honouliuli

5 33 *Melaleuca*
fairly common, planted
in reforestation

✓✓ ~~March~~ April 5 - Honolulu:
Kalihi (grounds of B. P. Bishop
Museum)
around buildings and
in lawn.

6. 34 *Plantago virginica* L.
abundant

7. 35 *Asystasia gangetica*
local, not seen elsewhere

3 36 *Vernonia cinerea*

2 37 *Vernonia cinerea*

rhizome prostrate,
inflorescence erect,
flowers blue-violet,
stamens yellow.

rhizome prostrate,
culms ascending.
tips mostly flattened.

slender tree 3-4 m. tall,
stamens white.

corolla lobes of fls. of both sexes
reflexed (small rays & erect after pet.)
elongate, much-branched
herb, flowers pale lemon
yellow within, pale bronze without.
flowers white.
flowers purple.

with 29837

" 29836

- ✓✓ Apr. 6 - Honolulu
 29838 *Perilla frutescens* var. *nankinensis* (Deens.) Bailey
 cultivated in gardens
 (brought in by Constance Iwada)

Apr. 11 - Fire-break trail, lower
 east fork of Haleaunau Gulch,
 lower slopes of Puu Kaala,
 Waianaeua 600 m.
 moist woods on wall
 of gulch.

- 6 39 *Panicum*
 common
- 3 40 *Nerandia melastomaeifolia* var.
 occasional
- 4 41 *Hedyotis schlechtendahlana* var. *cordata* (Leprieux) ~~fil.~~ var. *glauca*
 (Leprieux) ~~fil.~~ var. *glauca*
- 1 42 *Nerandia melastomaeifolia* var.
 occasional
- 2 43 *Dryopteris*
 common on banks above trail
- 2 44 *Dryopteris*
 common along trail

strongly aromatic; leaves
 green above deep red-bronze-purple
 beneath; flowers pink;
 used in preparation of
 "ume boshi" or pickled
 plums, also in salads
 and in fritters by Japanese.
 "beefsteak plant"

culms prostrate to
 ascending, panicle maroon-
 purple.
 sterile shrub 1 m. tall

(calyx lobes too long
 for *var. cordata*, too
 wide for *var. glauca*)
 shrub 1 m. tall, sterile

fronds sub-horizontal

fronds erect

April 11 - middle ridge
of Haleaun Valley, ~~east~~ ^{northeast}
slope of Pui Kaala,
Waianaeula
dense moist forest, on
~~the~~ steep ridge, changing
upward to mossy rain forest

29845

Dianella

common, forming
patches in the shade

3

46

common, on ground in
shelter of large boulder

1

47

Polypodium

on ground at base of tree trunk

5

48

Elaphoglossum

in crevices on large boulder

5

49

Wikstroemia

opening in moist forest

1

50

Youngia japonica

occasional on steep ridge
in wet forest.

5

51

Nephrolepis cordata

common on steep ridge
in wet forest

7

52

Phyllostegia glabra var.

common ^{locally} on steep wet ridge

5

53

Coprosma longifolia

common, wet forest

stems ascending
to 1.5 m. tall; flowers
with inner segments
whitish, outer dull purple.
forming golden-green
~~rosettes~~ cushions

750 m.

moist for.

750 m.

moist for.

750 m.

moist for.

750 m.

moist for.

800 m.

erect shrub 1.5 m. tall; flowers
yellow-green with orange anthers.
flower, yellow

900 m.

very few plants have
tubers.

plant decumbent,
flowers white
stem sharply quadrangular,
erect shrub 2.5 m. tall
flowers green with
fleshy translucent white stigma.

April 11 - summit of Puu
Kaala. east side, Waianae
low bushy wet mossy forest,
somewhat decadent due
to military activity.

29854 *Cheirodendron gaudichaudii*
5 common

55 *Polypodium*
occasional, epiphytic

56 *Pipturus*
common

57 *Nertera granadensis*
on mossy cut banks

58 *Rubus*
common, forming tangles

59 *Coprosma ochracea* var. *kaalae* H. J.
common

✓ April 12 - Honolulu, Kaimuki
60 cultivated in pot

Military installations on summit
have destroyed ^{or damaged} the vegetation on
the north edge, causing great
increase of *Rubus* and *Kuddeia* *aristata*.

much-branched tree
6 m. tall.

low, much-branched tree
4 m. tall, large leaves
on lower branches, smaller
on upper fruiting branches;
leaves greenish-white
beneath; ~~the~~ styles
reddish; fruits white,
fleshy.

prostrate, light green;
leaves firm; flowers
yellowish green, perfect;
fruit orange-red;
canes elongate, ^{arching} tangled;
flowers white, 5 cm.

across; fruit large.
dense ^{erect} shrubby ~~tree~~
2 m. tall, flowers green
with fleshy white stigmas.

leaves glaucous beneath,
flowers yellow.

Primocane
over 1 m. tall

✓
29861

April 14 - ~~the~~ Honolulu, Makiki

cultivated in yard.

✓ April 14 - Honolulu, Manoa
University campus
cultivated

4. 62 *Ficus*

6. 63 *Terminalia*

3. 64 *Matisia*? (*Paragium*?)

65 *Paullinia*

tall tree with umbrella-shaped crown, drooping branches; leaves turning red when old; flowers pale green. Fruit eaten by Filipinos, said to be native of Philippine Is. brought in by Gerrit P. Wilder.

spreading tree, lactiferous (the *F. pandurata* Hort. but not of Hance.) Fruit hard, green with white speckles. rounded tree; flowers ill-scented; fruits reddish black when ripe, with slight bloom. large sterile tree 10 m. tall - never has flowered, brought in by Rock many years ago.

✓✓ April 16 - Kaneohe Naval
Air Station, ~~At~~ Kaneohe Bay,
Mokapu Peninsula,
dunes of coral sand back
off beach

29866

4

Lama sandwicensis
very local ~~much of the~~
on open sand, much of
former habitat taken
over by a solid stand of
Sporobolus virginicus

3

67

Digitaria henryi
common ~~on~~ binding
loose sand, this specimen
from a well-protected spot.

5

68

Euphorbia degeneri
very common everywhere
on sand.

✓✓ April 16 - Waimanalo

3

69

Elephantopus spicatus
weed in street

✓✓

April 16 - Koho Head.

52

70

Schiedea globosa Mann
common on steep eroded
tuff slope

53

71

Marsilea velloso
abundant in open bottom
of crater

This area has been greatly
disturbed by military
activity. The dunes have been
burned over, and the *Sporobolus*
has formed solid stands at the expense
prostrate, flowers
rose-purple with ^{of} other
pale green tube. ^{plants.}

prostrate, forming
mats, exposed plants
much more depauperate.

spreading, flat-topped
plants; glands green.

flowers whitish

caespitose; leaves
glossy, fleshy.

forming dense turf.

1949

Hawaii

✓✓ April 18 - Kailua
29872 *Lepidium*
? common in pasture

✓✓ April 18 - Nuuanu Valley
73 *Ipomoea obscura*
? common in open grassy field twining over grass.

✓✓ April 18 - Roosevelt High School,
Honolulu, Makiki
74 *Citrus exylum*
planted as street tree

April 24 - Manoa Cliff Trail
e. slopes of Mt. Tantalus;
back of Honolulu, Manoa
moist forest at top of
cliffs.

5 75 *Psychotria hexandra*
rare

5 76 *Ageratum*
small colony

3 77 *Citrus exylum*
rare

erect; flowers white.

herbaceous vine;
corolla yellowish-white,
purplish at base,
anthers straight,
stigma capitate.

windled tree 5 m.
tall; old leaves turning
dull reddish orange;
flowers white, with
heavy oily fragrance
(like *Pittosporum*).

500-600m.

shrub 2.5 m. tall; flowers
white, mostly dry,
5-6 merous.

aromatic herb; flowers
bright lavender, showy.
shrub 2.5 m. tall; flowers
white, with a heavy
fragrance.

29878 *Metrosideros*
common

4 79 *Boea elatior*
occasional

2 80 *Acacia koa*
common

2 81 *Psychotria (Straussia)*
common

2 82 *Psychotria (Straussia)*
common

1 83 *Psychotria (Straussia)*
common

5 84 *Lantana camara*
occasional

1 85 *Begonia*
rare, one plant seen in
rock crevice

5 86 *Labordea tinifolia* var. *honoluluensis* Thierff
occasional

1 87 *Gleichenia linearis*
common

mass collection of a
small twig from each
tree within reach from
trail, to show variation
in leaf shape + pubescence.

shrub 2.5 m. tall,
bud only.

low spreading tree,
fruit immature.

shrub 3 m. tall,
flowers white, fruit
immature. ♀

tree 5 m. tall, flowers
white.

mass coll. of a
flowering twig from
each tree within reach
of trail, flowers
varying from 3 to 6
merous. Note persistence
of stipules at base
of peduncle except in
one with pendent cyme.

shrub 2 m. tall, very
prickly; flowers
pale pink with yellow
eye.

stem fleshy; flowers
whitish.

shrub 2 m. tall, leaves
glossy
dense tangles.

✓✓

April 24 - Head of Panoa Flats,
~~the~~ edge of Nuuanu Valley,
 lower slopes of Kōnāhuanui
 bushy ridge

29888
5.

Scaevola gaudichaudiana x *mollis*
 occasional, in company
 with both parents

1.

39 *Wikstroemia*
 common locally

2.

90 *Wikstroemia*
 common locally

5.

91 *Myrsine*
 rare

5.

92 *Cheirodendron*
 local

✓✓

April 25 - Kaena Point

Dunes of coral sand piled
 over broken basalt, with
Heliotropium ananaleum and
Scaevola frutescens dominant
 as binders, *Atriplex semibaccata*
 and *Sporobolus virginicus*
 locally common.

93

Panicum toridum
 rare, one plant seen

550 m.

shrub 1.5 m. tall,
 flowers purple.
 (other individuals
 seen, some with buds
 pubescent - coll. G. Fagerlund
 for chromosome studies)

♀?

~~dense tree like shrub~~
 shrub 2 m. tall,
 flowers greenish yellow.

shrub 1.5 m. tall,
 ♂ flowers yellow, pollen
 orange.

shrub 1.5 m. tall;
 fruit green.
 shrubby spreading tree
 3 m. tall, fruits dark
 maroon.

29894 *Heliotropium anomalum*
2.

1. 95 *Heliotropium anomalum*

3. 96 *Heliotropium anomalum*

April 25 - coastal flat 1 km.
e. of Kaena Point, Kaena
dry open flats, broken
basalt, dominated by
Myoporum.

5 97 *Myoporum sandwicense*

5 98 *Myoporum sandwicense*

May 1 - Honolulu, Kuma
Foster Gardens

3 99 *Bignonia magnifica*
cultivated

suberect, bushy plant,
pale silvery green; flowers
fragrant. full in appearance
white with tiny yellow eye.
prostrate, buried in
sand except tips.
silvery, flowers white
with yellow eye, very
fragrant (more than #29894 & 96)
prostrate, buried in
sand, except tips, silvery;
flowers white, full
in appearance, with tiny
yellow eye, fragrant.

rounded shrub
1 m. tall, leaves somewhat
fleshy, flowers pinkish,
purple around orifice,
fragrant.
same

wine climbing on fence;
flowers rose-purple. throat
pale within with purple
lines on palate.

1949 Hano. I.O.

✓✓

May 6 - Honolulu, Manoa
University campus
cultivated ground

29900

Emilia~~growing~~ ^{cultivated}

in pots from
cuttings brought from
Kauai.

3.

01 *Euphorbia pulcherrima*
cultivated in hedge

2.

02 *Euphorbia thymifolia*
weed in borders of lawn

1.

03
parasitic on *Euphorbia hypericifolia*

2.

04 *Oxalis*
common around edges of lawn

3.

05 *Apium leptophyllum*
common in borders of lawn

1.

06 *Borreria laevis* (Lam.) Griseb.
common in edges of lawn

2.

07 *Emilia javanica*
common in waste spots

✓✓

May 7 - Honolulu, ~~Kauai~~ ^{Makiki}
Lincoln School
cultivated

1.

08 *Polypodium scolopendria*

1.

09 *Phyllanthus nervosus* ^{v. roseifolius}

1.

10 *Polyscias guilfoylei*

1.

11 *Alpinia speciosa*

branched plant with
dark green, firm
leaves; lavender-purple
flowers, not much
exceeding involucre.
shrub, m. tall, lactiferous,
no red bracts, plant
trichotomous at top,
gland yellow. lobed lvs. ^{cartilag.}
prostrate, purplish
green.

prostrate, rooting at
nodes, flowers yellow.

flowers pinkish,
plant purplish green.
flowers red

rhizome prostrate
shrub 1.5 m. tall
leaves variegated
green, purple x white.
sterile shrub, leaves white-edged.
herb, m. tall, bracts white to pink,
at apex, glossy, rachis rose.

- ✓✓ May 9 - Waikahalaua
 Ravine 4 km. S. of Wahiawa
- 29912 *Eucalyptus*
 extensively planted in
 reforestation
- ✓✓ May 9 - Mokuia Beach,
 Mokuia
- 13 *Tetragonia expansa*
 naturalized locally
 after being planted by Otto Degener
- ✓✓ May 8 - Honolulu
 cultivated specimens
 brought in by students.
- 14 ~~*Pentas*~~ *Pentas*
- 15 *Pseuderanthemum atropurpureum*
- 16 *Ipomoea crassicaulis*
 var. *goodellii* Degener
- ✓✓ May 15 - Lanikai, Oahu
- 17 *Myrsine sandwicensis*
 cultivated

tree 15 m. tall, leaves
 leathery, aromatic
 when broken. Bark
 brown, thick, ridged,
 not exfoliating.

central stem erect,
 with extensive
 system of prostrate
 branches; leaves fleshy,
 covered with tiny
 distended cells.
 eaten as a potherb.

flowers white
 leaves deep bronze-purple,
 flowers crimson-pink.
 flowers lavender-pink.

rounded bush, in coll.
 flowers purple with
 white margins, very
 fragrant.

1948

Haw. Is.

✓✓

May 27 - Honolulu, Kaimuki,
Maunalaani Hts.

29918

Kokia cookii

cultivated as ornamental
(not doing very well)

5.

19 *Justicia betonica* L.
weed on bushy slope

✓✓

May 29 Maunawili
20 *Anacardium occidentale* L.
abundant in secondary
scrub vegetation, probably
planted

✓✓

June 4 Honolulu Univ. of
Hawaii

5

21 *Conilia bipinnatifida* Men.
cultivated in pots from
plants brought from ~~Hawaii~~
by M. B. Linford.

✓✓

June 5 Honolulu

22 *Crotalaria*

(nos. 29920-22 left to be mailed
by Cowan)

shrub 2.5 m. tall, with
thick trunk; petals
deep orange-old rose,
young anthers dull
flesh color, older maroon,
pollen red. (note that
fruit dehiscence clear to base)
much branched herb
up to 1 m. tall; bracts
white, veined with
green; flowers lavender.

small bushy tree
4 m. tall, flowers greenish
red.

luxuriant plants
with dark green
sub-fleshy leaves
(same as # 29900)

June 7 - The western part of the state, ^{as seen from there,} appears to be very dry, but is intensively cultivated. Over large areas dendritic gully systems are eating into the flat wheat land. That this process is at present active is shown by the fact that, though the bottoms of the ravines are filled with vegetation, their edges are bare, red or tan subsoil.

At about Oklahoma City the character of the country changes, becomes green and more or less wooded in places.

June 7 Arkansas from the Ozark area is an extensive rolling peneplain, almost completely wooded except for occasional clearings, these, surprisingly often on hilltops. A few eminences rise a bit above the general level.

June 7 - East of Albuquerque is some picturesque mesa country, with narrow curved mesas, apparently ^{erosion} remnants of a hard cap-rock. A ~~lava~~ lava core similar to Devil's Tower Wyo. was seen from there.

June 11 - Gander Airport
 Country of low relief
 (sign on airport says 457 ft. alt.
 but does not seem right),
 deeply cut by fjords.
 Largely wooded with
 mixed forest of *Betula*,
Populus tremuloides, *Picea*,
Alnus, *Salix*, *Abies*, & *Larix*.
 The forest is about 5-11 m.
 tall, the spruces gregarious.
 The young leaves of the
 others pale green by
 comparison. *Abies* is rare.
 Spring is well advanced,
 most things (except *Salix* & *Acer*)
 being leafed out but the
 leaves still fairly delicate.

East of Gander a typical
 drowned coast-line,
 very deeply cut. Small
 icebergs seen here.
 Hundreds of islands,
 these apparently with
 low woods toward center
 bare around edges.

substratum
 a glacial till
 with large
 boulders
 of crystalline
 rock.

The patches and larger
 areas of dark spruce
 give a rather somber
 cast to the landscape,
 well setting off the
 light green of other trees.

Undergrowth is of
Rubus, *Amelanchier*, *Pyrus* (barbarus),
Vaccinium, *Rhododendron*,
Kalmia, with *Pteridium*,
Dryopteris, *Tridentella*, *Coptis*,
Comarostaphyle, *Viola*, *Clintonia*,
 etc. and *Rosa* in openings,
Equisetum abundant
 in clearings, just coming
 up.

Large areas are bog or moor,
 slightly raised above
 surrounding forest and
 with a ~~peat~~ spongy
 brown peat at least
 1 m. deep (ditch cut in it),
 dry on surface but with
 water ~~but~~ not very far
 down. Here are *Chamaedaphne*,
Kalmia, *Sedum*, *Vaccinium*,
Saxifraga, and tiny spruces
 and larches in plants
 thickly set with old
 trunks of dead shrubs
 up to 1.5 - 2 m. tall.

11

June 7 - Gander Airport
low forest, clearings and
patches of moss.

29923

Juncus

rare on bare ground in clearing.

1

24

Eriophorum

occasional in moss

2

25

Ledum groenlandicum

occasional at edges of
forest and in moss.

1

26

Trientalis

occasional in edge of forest

1

27

~~Betula~~ Betula nanaoccasional in scrubby
forest.

1

28

Cornus canadensis (a. suecica)

common in edges of
woods.

1

29

Alnus

abundant in low forest

1

30

Coptis groenlandica

very local in wet places
at edge of woods

2

31

Vaccinium

common in edge of wood

2

32

Ribes

occasional in edges of woods

2

33

Salix

common

flowers yellow.

~~sub~~ subshrub 3 dm. tall,
flowers ~~rose-purple~~ with dull reddish spots.
loose clumps, flowers
white. lower part of stem
reddish, rhizome and roots white.
shrub 2 m. tall.

bracts ^{flowers} greenish white

shrub 3 m. tall.

rhizomes bright golden
yellow, ~~flowers~~ petals
white, bronzed outside.
prostrate shrub;
flowers whitish.

erect shrub, flowers
dull pinkish.

shrub 2 m. tall (others seen
up to 5 m.); leaves slightly
glaucous beneath.

v

June 12 - Island of Voorne, 25 km. sw. of Rotterdam, Holland
southwest coast

29734

Galium
local on ^{in openings} stabilized sand
dunes with bushy vegetation

extreme western point
of island
on sand dunes with
varying vegetation.

35

Galium
local in open places

36

Lambucus nigra L.
abundant, one of principal
species on sand dunes

The entire seaward or
western side of the island
is surrounded by a broad
belt of sand dunes. Even
within 20 years there have
been advancing in a
seaward direction notably.
This has been occasionally
assisted by artificially
building dunes in gaps in
the outer circle.

Visited them in 2 places.
one at western point where
they are not completely
stabilized, the other to the
south of this where the
inner dunes are completely

flowers yellow

flowers white.

shrub 2 m. tall; inflorescence
flat topped, flowers
cream-white.

stabilized and covered
with a low scrubby
forest of Crataegus, Rhamnus,
Quercus, Fagus, Sambucus,
Betula, Salix, etc.

A great many herbaceous
~~species~~ genera are here -
Valeriana, Brassica, Geranium
(Robertianum), Ophrys, Potentilla,
Arenaria (Moerwingeria), Silene, etc.
Patches of Hippophae rhamnoides
remain but are not dominant.

*Spartina
vulgaris*

On the unstabilized dunes *Arenaria ammophila* and another grass are the first sand-binders on the ridge just back of the beach. Then *Salix repens*, and *Hippophae rhamnoides* take over, the latter forming a thick rigid bush. Large patches of the latter were dying.

It was blamed on the rapid exhaustion of the calcium in the soil by this plant. *Sambucus nigra* is next to *Hippophae* in abundance, more common toward the back of the area, where it is in most places dominant.

It is a rather dense shrub, very abundantly flowering. The infls. flat, not exceeding the leaves, all of a uniform small size, is said to be confused with any Amer. species. Leaves look somewhat like those of *S. rac. v. callicarpa*.

There is a large flat boggy area enclosed by the dunes, with various sedges. *Orchis incarnata* in two color forms - pink & rose purple, with some gradation. *Riparis* sp., *Galium* sp. etc.

There is a little open water, with *Scirpus* and *Phragmites*. Many sea birds & shore birds.

This flat area used to be salt, wet by all very high tides. The building up of the outer row of dunes cut this off and allowed a thin lens of fresh water to accumulate over the salt and many more fresh water marsh plants to grow. *Glaux maritima* is common on the flat.

On bare sand, both flat and sloping, *Sedum* acre is almost a carpet.

Over much of the flat land *Hippophae* is a solid stand, except in the wettest places.

June 17 - Amersfoort

Saw a stork nesting on top of a platform on a pole in a back yard. They are very rare now, as they have been poisoned by eating poisoned locusts in Africa.

The male or female stays on the nest while the other goes out hunting fish, frogs, etc. for food. Platforms are relatively common, more so in N. Holland, where there are still a few.

✓✓ June 20 - de Bilt, ^{suburb of} Utrecht, ^{Neth.} Utr.

Meadows with rows and small patches of trees

29937 *Fagus sylvatica* L.
along small lane

✓✓ June 22 - The Hague, N. H., Holland
coastal dunes much disturbed
by military activity, fertilized
by addition of refuse from city.

38

uncommon

39

Panicum junceum ~~*Panicum junceum*~~ ~~*Panicum junceum*~~ ~~*Panicum junceum*~~

very common

40

Silene otites Lm.

♀

common locally

41

Silene otites Lm.

♂

common locally, more common
than ♀

42

Galium mollugo

occasional

43

Galium verum

saw here another nesting
stork.

Chelidonium majus common

tree 10 m. tall, leaves
unusually small.

blue-green, often growing
larger than this specimen.
petals very narrow, white.

petals very narrow, white.

plants depressed, spreading.

flowers white.

plants prostrate at base,
till erect, flowers yellow.

The herbarium at the Botanical Institute of the University of Utrecht is about the second largest in Holland. It has more living plants than anything else, but has some general things, too. Half of it is still in cardboard boxes while the other half is in new wooden cases. Unfortunately these have been made with a sort of flange at the sides so it is difficult to get the plants out.

Arrangement is purely alphabetical. The genus covers are broken up geographically with colored labels. The species are not in covers, but each specimen has its own cover. They ~~are~~ are on enormous sheets, and are not tied in bundles.

The Rijksherbarium in Leiden is a very well organized place in many ways. It is better staffed than any herbarium that I know.

In all of Holland there is said to be only about 2% unused land. Cultivation is imbelievably intensive, even tiny plots of ground are made into gardens. I saw little except the flat coastal lands, either former tide-flats or reclaimed sea-bottom, "polders". The exception was a small area around Utrecht which is composed of morainal deposits, this, near Amersfoort actually making a small eminence a few feet above the surrounding plain.

The waste-lands are principally the few remaining heaths - areas of Calluna that are the results of prehistoric clearing and burning - this was sheep-pasture but in recent years has been mostly reclaimed and put into cultivation - and the strip of dunes that extends along the coast.

At least in the low flat areas the towns are very densely built up, and there is an abrupt transition to country. The buildings are all built on piling - formerly wood, now concrete, because of underlying strata of peat

alternating with clay or sand. The weight of the thin layer of soil above the water-table and of the buildings themselves causes a squeezing out of water from the peat and a gradual lowering of the general ground level. Therefore the piling must be deep enough to reach firm ground beneath. Wooden piling lasts indefinitely as long as the water covers it, but rots rapidly at and above water level. Therefore much of the old wooden piling has had to be replaced, down to the water level, with concrete.

Part of the soil is quite peaty - the peat when reasonably pure, is dug out and dried for some months and used for fuel - but near the coast are large sandy areas.

At about the transition is the belt where tulips are raised in great numbers.

Tulip bulbs are planted about October and the ground is covered with straw in the winter. After flowering the flowers

are cut, so as to avoid the drain on the bulbs caused by fruiting. Then, when mature, in June or July, they are dug and stored in barns.

The agriculture is general, about evenly divided between dairying and general cultivation. Grain, sugarbeets, beans, and all types of vegetables, ^{as well} ~~as~~ ^{as flowers} are grown. Potatoes are one of the largest single crops. Culture methods are such that all ~~plots~~ plots seem to be yielding heavily. There is considerable cultivation under glass, an unheated simple type of low glass house, about 6-8 feet high is used. Here are raised grapes, tomatoes, cucumbers, and even peaches. Some vegetables are raised in cold frames, too.

The meadows are of two types - pasture and hay. The pastures seem to have a noticeable amount of *Ranunculus*. The plants are generally native. The hay meadows are of a mixture of native grasses - *Alopecurus*, *Polygonum*, ^{Holcus}, *Bromus*, *Avena*, *Poa*, etc. Hay is cut 2-3 times a year. Haystacks are between 5-6

poles with holes at short intervals. On these poles is a movable roof that is set at the proper level on pegs through the holes.

The whole area is crisscrossed by dikes and canals. The dikes are cultivated, usually in hay. The canals are of all sizes, from small ditches to broad shipping canals that carry a large part of the country's freight. Small canals are used as fences to confine the cattle. The smaller canals are not between dikes but the larger ones are. Their water levels are carefully regulated. The smaller canals are an indication of the general water-table of an area, which is seldom more than a foot below the surface of the ground. Windmills and electric pumps are used to take water from the small canals into the larger ones, whence it eventually runs into the sea. The

soil is so impervious that though the water in a canal may be several m above that of an ~~adj~~ adjoining ~~pool~~, there is little seepage.

The windmills are of three general types - water mills, grain mills and saw mills. The two water mills examined near Leiden consisted of three axes, geared with large ~~wood~~ ~~oak~~ wooden cog wheels with oak cogs. The ~~upper~~ horizontal axis, extending from the wind sails through the cap of the mill, through a wooden bearing to another wooden bearing in which a metal point works. ~~on this~~ This is a large oak beam, reinforced with oak planks, bound together with iron bands and wedges. It has a large wheel just inside the wall of the cap, surrounded by brake shoes which are applied by a large lever.

This is to stop the mill if it heats, to prevent fire. The wheel must be stopped instantaneously, or there will surely be a fire. The vertical shaft has two small ~~reciprocating~~ pinions which engage the teeth of the large

wheels of the other shafts, and point bearings at top and bottom. The lower horizontal shaft has a large cog wheel and a paddle-wheel which operates in a sluice outside the mill.

The cap revolves to keep the sails facing the wind, and is controlled by a large wrench and chain anchored in the ground outside, and operating by means of a beam and a framework of poles.

The external part of the mill consists of two great cross beams or masts, with a board on one side of each end, this in recent mills streamlined, and on the other a wide lattice, slanted and with the outer distal corner curved. This lattice is strong enough so that a man climbs up and fixes the sails when needed, though in a good wind the mill will turn without sails.

The pumping action depends on the operation of a loose wooden gate in the sluice, which is pressed shut

by back pressure, but when the paddle-wheel builds up a greater counter pressure the gate opens and the water flows through.

The angle at which the arms are held at rest has a definite significance. If one pair is truly vertical, it means that the mill is out of operation and will never be used again. When they are at 45° angles and decorated with banners it means that the inhabitants are having a festivity. If at 45° angles and not decorated the mill is out of activity for over a week.

Other positions indicate temporary inactivity, death among the inhabitants, etc. but these vary with the part of the country.

The tower may be of brick but is usually of thatch of straw. It may be 2, 3, 4 or more stories high and is usually inhabited by the miller and family. The thatch on steep walls is very durable, in one case examined having been not renewed for at least 70 years. On flatter surfaces

water seepage leads to rotting much earlier.

Most of the mills are 2-300 years old. In many places their function is being taken over by electric pumps, but the mills are very economical, one examined having not needed repairs in 40 years.

They are appreciated as a feature of the Dutch landscape and there is even a society for the preservation of windmills.

Societies for nature preservation are very much a feature of the Dutch society. They are maintained by popular membership and gifts. They are strong enough to force recognition by public and government. When a piece of land is desirable for a nature preserve the society either buys it or makes an arrangement with the owner to set it aside. Residence and occasionally certain fishing privileges are compensation for cost taken. Several kinds of preserves exist - those open to the

The woodlots are planted both to supply wood and for aesthetic reasons. During the war the Germans cut many of them and after the war, because of fuel shortage, the Dutch cut many more. They are already being replanted, or have been.

Natural forests scarcely exist in Holland. One patch in one of the national parks, is supposed to be natural, but most is in the form of planted woodlots. The trees, though mostly North-European, are by no means all so. Poplars of several kinds, oak, mainly *Quercus pedunculata* but also several introduced ones - *Falix*, *Ulmus*, *Fagus sylvatica*, *Acer pseudoplatanus*, *Pinus sylvestris*, ^{*Betula*} ~~and~~ *Crataegus*, and several sp. of *Salix* are the most commonly seen trees. ~~These~~ ^{Locally} *Acer rubrum*, *Quercus rubra*, *Asclepias hippocastanum* ~~etc.~~ *Platanus*, etc. are found. Some of these are more commonly planted along roads. These woods are commonly devoid of dense undergrowth. Around the edges *Sambucus nigra* and *Crataegus* form thickets. In cleared places *Betula* appears spontaneously in abundance. *Robinia* and *Carpinus* are also common. A number of grasses and herbs are characteristic of these woods, too.

The dunes (see pp. 118-122) are the greater part of the more or less undisturbed vegetation of the country. And they are much disturbed now by German military activity during the war.

The first plants to colonize the sand are *Ammophila arenaria*, *Elymus arenarius*, *Triticum junceum*, and *Callitriche maritima*. They are followed by many others - *Sambucus*, *Berberis*, *Galium verum* and *G. mollugo*, *Salix repens*, *Hippophae rhamnoides*, *Corynephorus maritimum* - a handsome holly-like species - several herbaceous legumes - *Lotus*, ~~etc.~~ several *Lilium*, etc.

The succession is influenced by the amount of lime in the soil, salinity, etc. It proceeds quite rapidly if not subject to grazing. The advanced stage, where there is not too much ~~exposure~~ ^{exposure}, is a forest of *Quercus*, *Crataegus*, etc.

The vegetation of embankments such as dikes, railroad emb. etc. is much like that of meadows except that *Papaver* ~~et~~ *rhoeas* and some other strictly pioneer species are common, due, perhaps to the drainage and possibly the newness of the habitat.

Water is everywhere in Holland, so the aquatic vegetation is well developed. In the lakes and canals are many strictly aquatic plants in abundance - submerged such as *Potamogeton*, *Elodea canadensis* (wasser-pist) and *Enteromorpha* - floating as *Lemna*, *Spirodela*, *Azolla* (int.), *Stratiotes*, etc. and *Nymphaea alba* and *Nuphar lutea*. The *Elodea* and *Enteromorpha*, as well as *Stratiotes* must be cleaned out frequently.

Along the edges *Typha*, *Scirpus*, *Butomus*, *Sparganium*, *Alisma* (?) *Phragmites*, *Phalaris arundinacea*, *Iris pseud-acorus*, etc. are ~~also~~ *Juncus*, etc. are all common, also in marshes. No sphagnum was seen, so the peat must largely be of other things.

1948 Belgium
along Amsterdam - Brussel - Paris R.R.

Very soon after entering Belgium at Rosendaal the country changes and becomes a slightly rolling coastal plain. This is almost as intensively cultivated as in Holland, but there are a few pieces of fallow land here and there.

After Brussels it changes again to a sort of piedmont-like, rolling-hilly country. Patches of woods are occasional.

About half-way from Brussels to France are queer conical hills 1-2 ft. high, often covered with vegetation even to the top, and with trees, which turn out to be mine-dumps, probably coal.

doubtless been much altered it seems to be in a state of equilibrium and in fine condition.

July 4 - St. Germain enclaye
n.w. of Paris

Nearby is a large tract of fairly good tall woods on a piece of high ground. The trees are 20 or even 25 m. tall, straight, fairly widely spaced, but with crowns mostly touching and forming dense or semi-shade. It is crisscrossed by roads and paths.

The tall trees are mainly *Carpinus*, *Tilia*, *Quercus* and some *Ulmus* and *Fagus*.

There is a second story about 3-5 m. tall, mainly of *Crataegus*, with young plants of *Carpinus*, etc.

There is a thin undergrowth of *Rubus*, *Rosa*, *Hedera*, young *Crataegus*, *Carpinus*, etc. and such herbs as *Carex*, *Bromus*, *Gerum*, *Urtica*, *Geranium*, *Robertianum*, *Stachys*, etc.

with other things in the openings.

Though this woods has

1947 France

w
29944July 11 - Versailles in the
park of the Palace

on bark of tree

Paris - the principle street
tree is Platanus.The Phanerogamia section
of the Museum d'Histoire Naturelle
of Paris has a really large
herbarium.The general herbarium
contains almost everything
except several collections
that are kept separate, such
as that of Humboldt & Bonpland,
and that of Jussieu.The cases are curious
stacks of thin steel pigeon-
holes with doors that open
downward, individually
for each pigeonhole, held
at top by a snap. Though
built relatively recently
they are already rusting
through the paint. The stacks
are so high that ladders
must be used to reach
the upper ones.There is no place to
work in the herbarium,
only tiny tables being
available at the ends ofthe rows. Tables are
available in other rooms
around the rotunda at
each end. The library
is scattered around, much
of it in the rotunda.The plants are mounted
on rather thin paper by
paper strips. These are
most unsatisfactory.
The species are in covers
which are strapped in
parcels between two
stiff boards with a
webbing strap.Types are filed with the
rest, noted by a tiny
reddish label.Annotations are made on
"Determinavit" slips supplied
on very poor paper.Species are alphabetical
in the general, but split
into geographic regions
marked by numbered
and colored labels.

July 18. - 'Shores Corner,
Woking

"heath" - open land
dominated by *Erica* and
Calluna, with *Ulex*, *Betula*
and *Pinus*, thickets and
patches of woods.

- 29945 *Epilobium angustifolium* L.
common locally in openings
and edges of thickets
- 2 46 *Agrostis canina* L.
common locally in low
sparse thickets
- 2 47 *Scrophularia nodosa* L.
in shade in patch of
woods
- 2 48 *Stachys sylvatica* L.
occasional in shade in
patch of woods
- 3 49 *Potentilla erecta* (= ~~*Potentilla*~~ *Räusche*)
~~spreading patch~~, rare in
thicket, (also seen in open heath)

This open land is, I am
sure, maintained only
by fire. The whole is
being rapidly invaded
by *Betula*, and barring
further fires, will be
a birch forest in a few
years.

The flora is remarkably
poor, probably only a
few dozen species. Where
thickets or patches of
woods have grown up
there are more than in
the open, where the three
heathers, birch, and
gorse are almost
the entire vegetation.

herb 1 - 2 m. tall,
flowers bright rose-purple.

(awned + unawned forms both
present)

- corolla greenish, upper
lip maroon.

herbage with a disagreeably
aromatic od.; flowers
mottled deep ~~maroon~~ crimson.
- sprawling patch of
decumbent stems; flowers
bright yellow, 4-merous.

- 29950 ✓ ✓ ~~Calluna~~ *Calluna vulgaris* (L.) Hull
common in sheltered places
- 2 51 *Betula alba* (= *verrucosa*)
in patch of low woods, young
plants common everywhere
- 3 52 *Molinia caerulea*
common in open heath
- 2 53 *Quercus pedunculata*
occasional in thickets
and patches of woods
- 2 54 *Erica cinerea* L.
common in open heath
- ✓ 55 ~~*Calluna vulgaris*~~ *Erica tetralix* L.
very common in open heath
- 2 56 ~~*Calluna*~~ *Calluna vulgaris* (L.) Hull
abundant in open heath
- 2 57 *Ulex europaeus* L.
common in open heath
and in thickets

weak shrub 1 m. tall,
much branched.
tree 7 m. tall bark
grayish

dense tufts

small tree 4 m. tall,
spreading; leaves glossy
dark green above,
glaucous beneath.
depressed shrub,
flowers light deep
magenta.

depressed shrub,
flowers rose pink,
turning brown and becoming
papery when old.
depressed shrub,
not in flower yet, but
buds pink-purple.
shrub 1 m. tall (others
seen to 2.5 m. tall).

July 13 - Box Hill, n.w. of
~~Box Hill~~ Dorking, North Downs,

"chalk downs" slopes
with thin soil overlaying
chalk rock with chert
concretions; with open
slopes and woods.

Practically no undergrowth
in *Buxus-Taxus* scrub.

Grassy slopes or dense
turf with various small
flowering herbs - *Bellis*
perennis most common.

29958 *Epilobium montanum*
common in *Betula* forest
on top of hill

59 *Galium verum*
local in openings and at
edges of forest on top of hill.

60 *Circaea lutetiana*
common in shade in
forest on top of hill

61 *Ligustrum vulgare* L.
occasional in bushy woods
and thickets; and in undergrowth.

Open grassy slopes - possibly
cleared and kept open by
grazing - alternating
with dwarf forest of
Buxus and *Taxus* (gnarled old
trees 2-4 m. tall) on steep
slopes, more mixed and
taller forest on gentler
slopes ^{edged with *Cornus*} and on top of
hill a patch of tall
Betula forest, pure
in center, mixed with
great ~~*Fagus*~~ *Fagus*, *Quercus*
fraxinosa, etc. with
understory of *Crataegus*
and *Buxus*.

In this a rich undergrowth
of *Rubus*, *Urtica*, *Rumex*, *Circaea*,
Epilobium, *Geranium*, *Stachys*,
grasses, etc. More species
in openings, esp. *Epilobium*
angustifolium.

up to 0.3 m. tall; flowers
pink.

prostrate or ascending,
flowers bright yellow.

erect; flowers white

shrub 2 m. tall; flowers
white with unpleasant fragrance.

29942

Geum urbanum

common in forest on top of hill

2 63

Galium aparine var. *vaillantii* W.D.J. Koch
occasional in woods on hilltop.

2 64

Buxus sempervirens L.
co-dominant in ~~scrubby~~ woods

2 65

Taxus baccata
co-dominant in ~~the~~ scrubby woods

2 66

~~Dioscorea~~ *Tamus communis*
occasional at edge of scrubby mixed woods

2 67

Scrophularia aquatica
rare at edge of scrubby mixed woods

3 68

Brachypodium pinnatum
occasional patches in open grassy slopes

2 69

Tenacum scorodonia
occasional in open slopes and at edges of woods

2 70

Asperula cynanchica
common on open slopes in turf.

1 71

Euphrasia nemerosa var. *calcareo*
occasional in turf on open slope.

3 72

Cornus sanguinea
abundant around edges of scrubby forest.

2 73

~~Brachypodium~~ *Brachypodium sylvaticum*
common at edges of forest

fls. yellow

tangled masses; fruit green.

shrub 3 m. tall; fruit green.

shrubly tree 3.5 m. tall, fruit green. (plants seen quite variable in aspect).

— twiner, flowers green.

erect; flowers bronze-maroon.

erect

flowers dull pale yellow; not especially aromatic.

flowers whitish to rose pink.

flowers white, with purplish markings on upper side and yellow on lower side of throat.

shrub 2.5 m. tall; ~~fruit~~ leaves green beneath; fruits globose, not quite ripe.

erect

hard masses, dark brown

29974

Myosotis arvensis

rare in forest on hilltop

75

*Campanula glomerata*occasional locally ~~in~~ in
turf on open slopesJuly 25 - Bagshot Heath,
SurreyPartially wooded heath
with *Calluna*, *Erica*
cineria, *Pinus sylvestris*,
Betula alba, *Castanea*, and
fields of *Pteridium aquilinum*The heath is principally
on higher ground than
the town of Bagshot.

76

Juncus

rare along roadside among pines

77

Juncus

along roadside, common locally

flowers blue-lavender

flowers deep purple.

Bagshot,

This region is ~~is~~ of a
mixture of a fine powder-
like sand and pebbles
of jasper, chalcedony & chert.
The humus layer on top
is in places very thin.
Large areas are open,
with heather only.*Calluna* is most abundant,
Erica cinerea prominent,
Erica tetralix localClumps of *Pinus* are
here and there, and in a
disturbed area, young
Pinus are coming up abundantly.
Parts of the heath are
wooded with a mixture
of *Castanea*, *Quercus*,
Betula, and *Pinus*, and
some of the rest is being
invaded by these, esp.
Betula. Many open areas
are dominated by *Pteridium*.subcaespitose, scapose
with basal rosettes.
caespitose

The British Museum of Natural History keeps the specimens in ^{manilla} folders very similar to those used in U.S.

Their cases are small mahogany cabinets with about 5 pigeon holes. These are screwed together in banks according to the height of the room.

They are getting a new and much larger hall, which will have about twice the former capacity.

Most types are segregated and kept in manilla envelope type folders.

The other specimens are stacked on racks at the present time.

The damage from repeated bomb hits is by no means as yet repaired.

The wooden cabinets did not result in as much fire damage as would have been expected.

The Kew Herbarium, now 6000000 sheets, is very well housed and arranged in three buildings connected by passages. The space is not at all well used, as the cases are on galleries around the great open halls. These galleries are 3 and 4 floors high. The 3 floor ones have the cases too high for comfort. The cases are wooden but quite satisfactory painted white.

B & H. arrangement. Sheets in manilla folders as we have them, ~~broken~~ arranged according to geographic regions and then according to a monograph.

Types in general herb. but in special manilla envelope folders with red edges.

Separate seed, fruit and drawing collections. Seeds in glass topped rectangular metal boxes.

✓✓

July 27 - Gander Airport
(see p. 114)

Open moor with ericaceous shrubs - *Kalmia*, *Chamaedaphne* ~~and~~ *Ledum* and *Vaccinium* dominant, sedges and moss abundant, *Eriophorum* in patches, much disturbed by construction of airport

Dwarf
Picea

29978

Eriophorum

patches in moor

79

Carex

in open spots between low shrubs in moor

2

80 *Carex*

in open spots between low shrubs in moor

1

81 *Nemophanthera mucronata* (L.) Trel.

occasional in more brushy spots in moor

3

82 *Ledum groenlandicum* Oeder.

common in moor

3

83 *Kalmia angustifolia* L.

dominant in moor

2

84 *Aralia racemosa*

common locally in moor

1

85 *Galium*

rare in weedy rubble

On rubble around airport, mainly crushed rock, several grasses, *Trifolium repens*, *Achillea millefolium*, *Chrysanthemum leucanthemum*, and other weeds as dominant

bases deep in moss

culms ascending, bases deep in moss, heads pendent.

culms spreading

shrub 1 m. tall, fruit green

dwarf shrub 2-3 dm. tall, flowers white, fruit immature pubescent tawny.
dwarf shrub 30 cm. tall, flowers bright pink.
erect herb; flowers whitish.

prostrate, flowers greenish-white.

1948 Newfoundland

July 27 - South east of
Newfoundland on Gander-
N.Y. route, seen from
air.

This country is evidently
a hard-rock formation
planed off by glaciation.

It is generally flat, but,
from high up, presents
a "hammered" impression,
with all of the depression
filled with water. In

some areas at least 1/4 of the
surface is water, in ponds
and puddles of all sizes.

Nearer the coast the boulders
and the ponds get larger,
tiny ponds become fewer.
Fjords penetrate far
inland.

The water in the ponds
is dark brown.

There are no trees at all,
and the substratum
shows grayish through
the vegetation.

There are here and there
curious crooked linear
ridges of light colored
rock running through
the general terrain.

✓✓

Aug. 9 - Blue Ridge Parkway
just south of Virginia boundary
Surry Co.

rather sparse oak forest
with *Nyssa*, *Ericaceae*
undergrowth, *Galax* very
abundant

29986 *Lysichiton leucostachyus recurvus*
occasional in undergrowth

2 87 *Galax aphylla*
abundant as ground cover

1 88 *Hedyotis purpurea*
occasional at edge of woods

2 89 *Cladonia*
common on earth at edge
of woods

2 90
common on earth at edge of woods

1 91
rare on earth

✓ 92
occasional on earth

✓✓ Aug. 10 - W. of Leno Gap, 7 mi. E. of
Cherokee, eastern foothills of
Great Smoky Mts. Jackson Co. 3500 ft. ±
road embankment, broken
granitic rocks, in region of dense
hardwood forest.

93 *Hydrangea arborescens*

(Kodachrome)

several oaks

shrub 1.5 m. tall.

leaves glossy green,
occasionally turning
red.

subcaespitose

apothecia red.

apothecia chocolate

fruiting bodies pink

sparsely branched
shrub, leaves green beneath,
flower white

1948 Mississippi, Tennessee
Arkansas

Aug. 11 - The country that remains in woods in northern Mississippi and s.w. Tennessee seems from a trip through Corinth and to Memphis, to be oak-hickory with many species of *Quercus* dominant. It is second growth, largely logged out, ~~but~~ open beneath. Here and there are patches of pine.

✓ ✓ Aug 11 - Arkansas, between Memphis, Tenn. and Little Rock, is coastal plain - low, flat, and with extensive swampy areas.

About 10 mi. n.e. of Little Rock on the road to Memphis is a lake surrounded by a belt of large *Taxodium*. In places this forms an extensive swamp. It is not much mixed with anything else, though there are willows

29994

Brunnichia cuneata

at edge of *Taxodium* swamp

around the edges. Both kinds of *Taxodium* seem to be growing here side by side, under identical conditions, as well as some trees that seem intermediate.

A vine that seems to be polygonaceous climbs into the *Taxodiums* around the edges.

lianas climbing several meters into trees, flowers whitish, fruit whitish green, pendent.

Aug. 12 - Driving from Little Rock to Dallas - Wooded areas are principally Oak-Hickory with various species of *Quercus* predominating. They are the common species of eastern U.S.

Somewhat east of Dallas the soil becomes black (at about Greenville) and forest becomes of secondary importance, found only along stream courses and lowlands.

vv Aug. 12 - Mt. Vernon, ^{Franklin Co.} ~~Wayne Co.~~ Texas

old field, with ~~scattered~~ scattering of *Quercus stellata*, especially around edges, and a pond of water.

29995 *Heterotheca*

46 *Cassia*

occasional

97 *Ruellia*

occasional

98 *Diodia teres* Wall.

abundant

99 *Croton*

abundant

30000 *Hydrolea*

common in mud at edge of pond

Aug. 12 - From Dallas to Ft. Worth and westward the oaks in the patches of forest change, eastern oaks dropping out and being replaced by Texas oaks.

West of Ft. Worth *Prosopis* suddenly appears and becomes abundant. Much brushy vegetation, dominated by *Rhus*, etc. found here, also.

- flowers bright yellow
erect, flowers bright
yellow, stamens black
- flowers pale lavender,
corollas falling very readily.
erect; flowers lavender.

erect, flowers white

decumbent to erect herb;
flowers bright blue

166

1947 Texas

Aug

April 13 - Albany

Shackelford Co.

thorn forest principally

Prosopis glandulosa

30001

Abutilon

roadside

02 *Oenothera*

roadside

03 *Convolvulus*

roadside, climbing on fence

04 *Prosopis glandulosa* Torr.

dominant tree

05

~~*Prosopis glandulosa*~~05 *Eryngium*

common among trees

April 13 - Abilene, Taylor Co.

roadside

06 *Martynia*

occasional

Rodach corner of

167

Prosopis thorn forest
(those of *Cucurbita foetidissima*
and Mesquite grassland
are near Gail, s. of Lamesa)

suffrutescent herb

0.7 m. tall.

flowers yellow,

open in

twiner; flower white,

stigmas linear.

small tree 4 m. tall;

fruits buff, marked

with deep red purple,

sweet inside.

erect, glaucous,

veins of leaves white

specimens made from

several *Chilopsis* trees

to show variation -

apparently a hybrid population

on boundary bet. 2 vars.

annual, root deep orange,

flowers off white, inside

pinkish inside; more

ivory outside, throat

within strongly brown-

punctate, a yellow-

orange stripe of lines

on lower lip, not

reaching apex.

168

1948

Texas

30007 *Chilopsis linearis* (Cav.) Sweet
roadside

08 *Chilopsis linearis* (Cav.) Sweet
roadside

09 *Chilopsis linearis*
roadside

10 *Chilopsis linearis* (Cav.) Sweet
roadside

169

shrub 2-3 m. tall;
flowers with corolla
with ground color
pale shell pink, lower
lip strongly marbled
with deep purple, upper
side of ~~throat~~ transverse-
ly banded with weak
purple yellow stripes
on lower side of throat
medium strength.
same

shrub 2-3 m. tall; flowers
with corolla with
pale shell pink ground
color, lower lip with
3 poorly marked spots
of purple mottling on
lower lip, upper lip
and upper side of
throat transversely
marbled with pale
purple, yellow stripes
on lower side of throat
within strong.

shrub 2-3 m. tall, ~~flowers~~
corolla with ground color
pale shell pink, with
three patches of deep
purple mottling on lower
lip, upper side of throat
transversely striped with
pale purple, yellow stripes inside
lower side of throat pale.

170

1948 Texas - New Mexico
30011 *Chilopsis linearis* (Cov.) Sweet
roadside

Aug

✓✓ ~~April~~ 13 - 10 mi. e. of Seminole,
Gaines Co.

sandy region with
low bushy vegetation
principally of *Quercus*

- 4 12 *Quercus*
on stabilized sand dunes
13 *Solanum* ~~*rostratum* Dunal~~
on stabilized sand dune

Aug

✓✓ ~~April~~ 13 - 38 mi. northeast
of Carlsbad, Lea Co.
New Mexico

low bushy vegetation
sparse, but covering ground

- 3 14 *Quercus*
dominant
7 15 *Heldotropium*
common on sand in
open places and roadside
16 *Eriogonum*
common

171

shrub 2-3 m. tall, flowers
with ground color pale
shell pink, whole
corolla marked with
pale purple, three narrow
patches of deep purple
on lower lip, yellow
stripes inside lower
side of throat strongly
marked.

low shrub about
4 dm. tall, sterile.
flowers bright yellow.

podochromes 2-4 of
(dwarf oaks and brushland)

low shrub about 4 dm.
tall.

corollas white, showy.

erect; inflorescence
flat-topped, flowers
whitish.

April 13

The country east of the Pecos is mainly covered by dwarf oaks and very scrubby rosas, and areas of Mesquite grassland. Mesas are frequent, capped by a bed of rock that breaks into even sized joint blocks. Kind of rock undetermined.

Aug. 14 - Carlsbad Cavern.

The vegetation here is a curious mixture of the yucca-cactus type, with *Dasylium*, *Fouquieria*, several *Opuntias*, etc. with *Juniperus* and other species from a higher altitude. *Rhus microphylla* is common. *Rivina* grows around the cavern entrance, possibly introduced, but a pink flowered form with curious subcordate leaves that I have not seen before.

The ranger with whom I talked says there is no flora written of the park. He also says that the entire fauna of the cave consists of 4 sp. of bats and a cave cricket.

West of Pecos, at Carlsbad, Larrea begins immediately though extreme desert conditions do not appear so immediately.

at Carlsbad Caverns a yucca-cactus-*Dasylium* vegetation is well developed on the ledges of the canyon surrounding the entrance to the cavern.

The latter feeds on a fungus (*Discomyces*?) which grows on bat guano. No snails, blind fishes or blind amphibians are known. The cave is a "mature" one - that is, there is little dripping water and consequently little building up going on at present.

The upper layers of the cave are in a bedded Permian limestone, somewhat fossiliferous, the lower parts are in a huge reef-limestone mass about 1,800 ft thick. The limestone is more or less dolomitized. There

is a good deal of gypsum present in the cave, apparently brought by waters from above.

The walls are covered by a travertine-like material strikingly like coral, said to be laid down when the cave was filled with water. In places this is covered by material added by dripping. In other places it goes only to ~~the~~ a given level, and above it is a fine, coral-like aragonite deposit, said to have been laid down in air, by seepage and evaporation.

There is in many places an amazing growth of stalactites and stalagmites and a curious type called helictites, which are intricate masses of stag-horn-coral-like projections growing at all angles and curved and branched in various ways from sides, a curious phenomenon apparently no good explanation of there has been offered.

Fourth in the valley from Carlsbad Cavern is a great expanse of gypsum. This would be most interesting to explore. A species of *Nama* (or *Coldenia*) seems to be dominant. The vegetation is quite sparse and dwarfed.

Crossing the south end of the Guadalupe Mts. a very few pines are to be seen.

1948 New Mexico

Aug. 15 - Mesilla Valley,
Texas boundary to Las Cruces.
A considerable change
has occurred since
1930. There are more
people, more land is
under cultivation and
there are less trees.

Populus, which then
was a prominent feature
of the landscape, is
much less common.

Along the highways and
around houses now
are many Liberian elms,
which I did not notice
at all in 1930.

The ~~land~~ additional
land under cultivation
now is largely from
the suacda - Allenrolfea
vegetation. This is apparently
brought into condition
by repeated flooding
to wash out the alkali.
Cotton is largely planted
here.

Mesilla Valley, Dona 177

The atriplex - Prosopis belt
has changed little in
extent or floral composition.
No apparent attempt
has been made to bring
it under cultivation.

Several small dams
have been made up
on the flats to improve
"tanks" of water in
small gullies.

On the flats the principal
change that has taken
place is that Yucca
elata has become
rather uncommon, but
the few plants left are
very tall. Acacia constricta
has become more
abundant and luxuriant.

At our old camp site at
the base of Pyramid Peak
is now a house for a
motor for electricity
to run a beacon which
has been placed on top of
the peak. A pole line runs
to the top. A small area
has been denuded around
the house and the top of
the mountain is somewhat
denuded. On the filled
ground around the house

Hoffmannseggia is the obvious weed. *Bahia* is also found.

The mating ants were also found, as expected, on top, but in smaller numbers than in 1930.

The *Chilopsis* has become abundant in the washes.

It does not seem to vary much vegetatively, but has much variation in ground color of corolla from white to deep lilac-purple, not at all banded or marbled, and in the amount of purple on the lower lip, and in the intensity of the yellow

Aug. 15 - about 1.5 mi. e. of Mesquite, Dona Ana Co.

washes and low hills of gravel, in larrea belt.

30017 *Koeberlinia spinosa*
rare in wash

18 *Chilopsis linearis* var. *glutinosa*
common in wash (Engelm.) Forb.

19 *Chilopsis linearis* var. *glutinosa*
same (Engelm.) Forb.

Both red and black and red ones were common, the red ones a bit smaller than the others. The black & red ones were mating with each other, but also attempting to mate with red ones, though none successfully as far as observed in a few minutes. The red ones were much more quiet. No *Dermetidae* were seen, but no mammal remains and only small quantities of dead ants were seen. Both types were collected.

strikes on the inside of the lower side of the corolla throat.

low spreading rigid shrub, stems dark green, fruits turning black.
shrub up to 1 m. tall, corolla rich lilac, palate purple, with yellow stripes running back inside of lower side of throat.
shrub up to 2 m. tall, corolla lilac, lower lip marked with purple, yellow stripe median.

2780 *Chilopsis linearis* var. *glutinosa*
same (Engelm.) Torr.

2781 *Chilopsis linearis* var. *glutinosa*
same

2782 *Chilopsis linearis* var. *glutinosa*
same

2783 *Chilopsis linearis* var. *glutinosa*
same

2784 *Eriogonum cyclosepalum* Greene
rare on gravelly slope

Aug. 15 - Pyramid (Bishop's cal.)
Peak (west base), Dona Ana Co.
broken limestone rubble

2785 *Eriogonum abertianum* Torr.
side of small ravine

2786 *Hoffmanseggia*
common on loose disturbed
earth in fill around building

2787 *Janusia gracilis*
rare on lower limestone ledges

2788
rare on alluvial flat.

shrub up to 2 m. tall;
corolla lilac, lower lip
lightly marked with
purple, yellow stripes medium
shrub up to 2 m. tall;
corolla lilac purple,
purple,
the pale
throat inside
2 m. tall,
lower lip
purple, yellow
stripes
lower side of throat.
?; corolla
deep purple
lip, yellow
side of lower
pale yellow.
~~with reddish~~
with reddish.

Cacti
on W slope of
Pyramid Pk.

Pyramid Mts. from
P.P.
and from
S.E. of P.P.

sunset from same

mesquite sand
dunes just west
of Deming
~~Antelope Island~~
nest well.

mesquite sand
dunes 15 mi. W
of Deming

mesquite grassland
rather cloudy, grass
in just under
actual horizon.

white
ro.
flowers
with black-
tips.
fleshy stemmed vines,
fruit bright red.

Cacti

on W slope of
Pyramid Mts.

Pyramid Mts. from

P.P.

and from

S.E. of P.P.

sunset from same.

Mesquite sand
dunes just west
of Denning
~~and as far as top~~
nest roll.

Mesquite sand
dunes 1.5 mi. W
of Denning

Mesquite grassland
with closely grazed
on just starting
wind erosion.

2790 *Chilopsis linearis* var. *glutinosa*
same (Engelm.) Forb.

2791 *Chilopsis linearis* var. *glutinosa*
same

2792 *Chilopsis linearis* var. *glutinosa*
same

2793 *Chilopsis linearis* var. *glutinosa*
same

2794 *Eriogonum cyclosepalum* Greene
rare on gravelly slope

Aug. 15 - Pyramid (Bishop's cal.)
Peak (west base), Dona Ana Co.
broken limestone rubble

2795 *Eriogonum abertianum* Torr.
side of small ravine.

2796 *Hoffmanseggia*
common on loose disturbed
earth in fill around building

2797 *Janusia gracilis*
rare on lower limestone ledges

2798 *Cucurbit*
rare on alluvial flat.

shrub up to 2 m. tall;
corolla lilac, lower lip
lightly marked with
purple, yellow stripes medium.

shrub up to 2 m. tall;
corolla deep lilac purple,
lower lip deep purple,
yellow lines on the pale
lower half of throat inside.

shrub up to 2 m. tall;
corolla lilac, lower lip
partly deep purple, ~~partly~~
pale yellow stripes
on inside of lower side of throat.

shrub 2 m. tall; corolla
lilac with 3 deep purple
spots on lower lip, yellow
stripes on inside of lower
side of throat pale yellow.

flowers ~~to 1 m. tall~~
cream, tipped with reddish.

erect, flowers white
tipped with rose.

deep rooted; flowers
orange-yellow, with black-
purple anthers.

shrub with twining
tips.

fleshy stemmed vine,
fruits bright red.

1948

Arizona

vv

Aug. 17 - ² ~~to~~ end of Waterman Mts.
just south of Tucson

Flat alluvial fan with
Cereus, Parkinsonia and
many shrubs

30029

Jatropha
occasional

1

70 *Triodia pulchella*

vv

Aug. 17 - Highway n. of
n. end of Baboquivari Mts.
alluvial fan covered
with cacti and shrubs.

3

31 *Boerhaavia (Anulocaulis)*
common in openings

2

32
common locally

2

33 *Euphorbia*
common locally

1

34 *Janusia gracilis*
rare

7

35 *Eriogonum abertianum* Torr.
common

3

36 *Boerhaavia*
common

low spreading shrub
with rather limber
twigs; flowers whitish.

ascending

rounded herb.
some much larger.
ray violet, disk
yellow.
glands white

shrub, semi-scandent.
petals bright yellow.

erect, very glutinous.

✓✓ Aug. 21 - Turlock

weedy cultivated ground.
irrigated.

30037 *Datura stramonium*
rare, recently introduced

2 38 *Amaranthus*
common

1 39 *Conyza*
common

2 40 *Amaranthus*
common

3 41 *Setaria sphacelata*
in wet places

erect herb 1 m. tall
erect from decumbent
base
erect. tips of flowers
purplish
erect, yellow & green.

v v

Aug. 28 - Between Benbow and Garberville
Humboldt County.

alt 475

30042

Mixed Oak, Madrone & Coniferous forest,
on dry slopes

30042

30043

on trunk of *Quercus chrysolepis*

30044

Galium

Common on dry talus

deep-rooted rhizomatous perennial

✓✓

Aug. 28 Rogue River

River terrace ^{dry} grass with
scattered oaks and evergreens30045 *Caemocarpus setigerus*

common in disturbed ground

46 *Polygonum*

common

47 *Quercus kelloggii*

common

(47

49

50

51

52

58 *Eriogonum nudum*?

occasional

59 *Berberis aquifolium*

occasional

60 *Lymphocarpus albus* (L.) Blakecommon along edge of
river bluff

61

common on oak trunk

62

at base of oak trunk

63 *Solidago californica* Nutt.?

local on flat in open sand; colonies

64 *Phacelia californica* var. *virgata*occasional on sand flat in
open.upright, flowers very
pale lavender (almost white)
tree 10 m. tall with
rounded crown; leaves
badly diseased

flowers whitish

shrub up to 0.8 m. tall.

fruit blue.

leaves somewhat glaucous
flowers yellow.
erect; flowers white.

VV

Aug. 28 - Dry Lagoon,
~~Flat~~ Del Norte Co.
 flats of fine gravel
 back of beach, with marshy
 area in center, lower
 bluffs at back covered by
 windswept brush of
 Gaultheria, Salix, Lonicera, etc.
 with some small Pseudotsuga

30053

Lonicera involucrata
 one of dominant plants at
 foot of bluffs in thickets

54

Franseria bipinnatifida
 common on ^{open} gravel flat
 (plants seen varying toward
F. chamissonis)

55

Gaultheria shallon
 dominant on bluffs just
 above seabeach.

56

Cephaelechites prenanthoides
 common around edges of thickets

57

Rosa
 occasional in thickets

shrub 2 m. tall,
 flowers yellow,
 bracts deep purplish-red;
 - fruits black, fleshy.
 prostrate, inflorescences
 ascending.

shrub 1 m. tall;
 fruits black.

erect, up to 1 m. tall;
 - flowers yellow.
 - shrub 1 m. tall,
 scrambling.

VV

Aug 29 -

Rogue River Nat. Forest

Mixed forest of *Pseudotsuga*,
Pinus lambertiana, *P. ponderosa*
& *Libocedrus*, with undergrowth

30065

Linnaea borealis

1 66

Campanula

2 67

Castanopsis chrysophylla
dominant undershrub

36

1 68

Castanopsis chrysophylla

3

1 69

~~*Hebe*~~ *Pterospora* *antennata*

2 70

Lymphocarpus

Aug. 29

VV

sandy roadside

71

Aster

common

72

Mimulus

abundant

of *Castanopsis* & *Ceanothus*
(much variation in the
Castanopsis)- spreading, very prostrate
- deep rooted
- low rounded shrub 0.7 m

- tall

- shrub 1 m. tall

- reddish brown, flowers white.
- shrub 0.5 m. tall; fruit white.

flowers rose-pink.

Aug. 29 - ^{w slope of Horse Ridge}
~~14~~ mi. S. of Bend
 3800 ft.

extensive lava flow
 with ^{thin} gray soil domin-
 ated by widely spaced
 Juniperus filled in
 with Artemisia tridentata.
 Chrysothamnus & Gutier-
 rezia, with various grasses

30073

3

Juniperus
 dominant tree over large
 area

74

v

Gutierrezia

common mixed with sage brush

Sage brush starts just
 east of Bend (only a few
 solitary plants seen
 S. of Bend.), and is almost
 immediately dominant.
 Then the Juniperus starts
 and forms an open
 woodland which
 continues east to just over
 summit of Horse Ridge.

~~In the~~

Aug. 29 - m. e. of Burns

alkali flat with
 Chrysothamnus, Parolobos

75

Iva

12 miles NW of Milican

dense rounded tree
 4 m. tall, immature
 fruit very glaucous.
 rounded shrub 4 dm.
 tall; flowers bright yellow.

✓✓ Aug 30. Malheur River 23 mi.
Below Juntura, Malheur Co. Or.
Dry flat with sage-brush
and several grasses, ^{various shrubs in thickets}

30076

Iva

4

common

2

77

Atriplex

common

2

78

Chrysothamnus

common

3

3

1

79

Ribes

occasional in thickets

2

2

80

Elymus

common

2

81

Claviceps

parasitic on Elymus (43070)

1

82

Rhus toxicodendron

common

✓✓ Aug. 30 - 13 mi. S. of Goodding
Id.

surface of dry lava flow
covered by thin grass.
in crevices on top of lava

83

Solanum

occasional

84

Nicotiana

same

erect (others seen at
other localities much larger)
white with reddish stems.

shrub 1 m tall, rounded,
flowers yellow.

shrub 2.5 m tall, leaves
thick, brittle.
large clumps.

semidecumbent
shrub, fruiting
branches erect, ~~fruit~~ white.

thin grassland on surface of
extensive lava flow.
bubbles & tubes.

prostrate, leaves
somewhat fleshy, flowers
white, fruits not quite
mature, gray-green.
erect, sticky; flowers
dull whitish.

Aug. 30 - Crater of the Moon

fresh lava and scoria
30035 ^{fresh} broken lava surface.

Aug. 31 - 3 mi n.w. of West Yellowstone, Gallatin Co. Mont.
extensive flats of *Pinus* ^{*bentata* v. *murayana*}, pure stand, very dry at this season.

3 86 *Galium*
abundant in depression that was marshy but has dried completely.

3 87 *Arctostaphylos uva-ursi* L.
common around edges of depression

1 88 *Campanula*
rare in depression

1 89 *Eriogonum*
very common, mostly past flowering and dry.

1 90 *Eriogonum*
same.

2 91 *Equisetum*
common around slopes of depression
Sept. 2 - Jackson Lake 2 mi. s. of
Moran, Jackson Hole Nat. Mon.
open pine - aspen forest

3 92 *Campanula*

4 93 *Spiraea betulaeifolia* v. *pallida*

Sept. 3 - mi. w. of Phillipsburg
Phillips Co. Kas.

steep side of road cut in crumbly

6 94 *Paronychia*

3 95 *Gutierrezia*

4 96 *Iva*

3 97 *Polygonum*

roots orange-brown.

dried completely.

prostrate, leaves glossy,
fruit bright red.

flower dried.

flowers greenish white.

flowers greenish white.

Wyoming

flowers violet-blue
much-branched from base, 0.8 m. tall.
flowers white.

white shale

flowers yellow - common
deep rooted - common along roadside ditch,
erect, flowers whitish

① 1948 - Missouri - Illinois

Sept. 4 - mi. e. of

nos. checked
labels typed
HK

30098

abundant very locally on
railroad right-of-way, only seen
in one area a few hundred yards
long.

erect, flowers cream-white.

Sept. 5 - 3 mi. n.e. of Towanda, Ill.
(n.e. Bloomington)

grove of mixed hardwoods on flat ground

30099 *Quercus stellata*

not common

tree 15 m. tall, leaves much more
dissected distally on branches

30100 *Lactaria*

under trees

erect

01 *Acalypha*

under trees

02 *Gaura*

common, locally under trees
erect, 1 m. tall; flowers pink.

03 *Chenopodium boreale*

common under trees

erect, up to 1 m. tall

Sept. 5 - 1 mi. n.e. Braidwood, Ill.

roadside ditch in open flat land

04 *Dracopis*

common

erect - flowers pink, lower lip
punctate with maroon

05 *Gerardia*

common

flowers rose-pink

Craters of the Moon



NATIONAL MONUMENT

I D A H O

Craters of the Moon



NATIONAL MONUMENT
IDAHO

Craters of the Moon National Monument



UNITED STATES DEPARTMENT OF THE INTERIOR

J. A. Krug, *Secretary*

National Park Service, Newton B. Drury, *Director*

Spectacular display of lava flows, cinder cones, and other products of volcanic activity

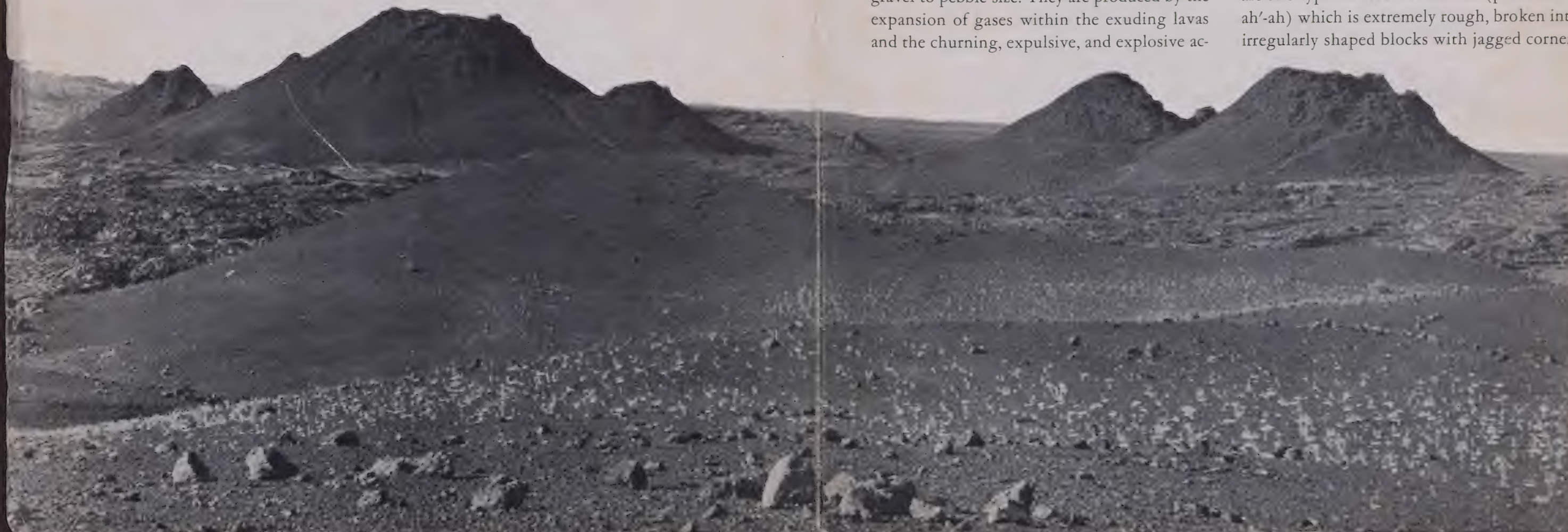
The Craters of the Moon National Monument, located in the central part of southern Idaho, is so named because the general appearance of the area is suggestive of the surface of the moon as seen through a telescope. The monument displays within its comparatively small area of 75 square miles an extraordinary variety of the phenomena associated with volcanic activity. Moreover, these interesting natural features are quite uniformly scaled down in size, and so closely grouped together that one might easily imagine nature had definitely planned this miniature laboratory of volcanism for the enjoyment, education, and scientific

study of men, without their having to make extended trips to distant portions of the earth for such observation.

The Great Rift

Geologists explain that this unique monument area has come into being because of "The Great Rift." Essentially, this rift may be described as a weakened zone, or series of fissures, in the earth's crust extending in a northwesterly to southeasterly direction, the length of the monument. During at least three prehistoric epochs, separated by perhaps many hundreds of years, the interior lavas of the earth issue along

Spatter cones near the Big Crater (Franz Lipp photo)



the rift with every kind of mild volcanic activity. There seems to be no evidence of cataclysmic or destructive eruptions such as are associated with several of the earth's famous volcanoes.

There is reason to believe that the latest of these mild eruptive epochs terminated within the past 500 years, after many years of activity, leaving the vast lava flows which cover most of the monument, the string of about 35 cinder cones and vents, the spatter cones, lava flows, tubes, and bombs, natural bridges, tree molds, and other interesting evidences of volcanism.

Cinder Cones—Lava Cones— Spatter Cones

The cinder cones, each with its crater, together with the lava and spatter cones, are adjacent to each other and extend the 12-mile length of the monument. Largest cinder cone is Big Cinder Butte which rises about 800 feet above its base. This small extinct volcano is among the largest purely basaltic cinder cones in the world. The "cinders" forming the cones are really hardened lava froth, rounded like gravel to pebble size. They are produced by the expansion of gases within the exuding lavas and the churning, expulsive, and explosive ac-

tivity of the eruption. Cinder cones are smoothly symmetrical and graceful in appearance.

Lava cones are produced by nonviolent flows of lava from a fissure opening. The fluidity of the molten rock produces low, rounded forms more accurately described as lava domes.

Spatter cones differ radically from the cinder cones, being smaller in size, formed of lumps of hardened lavas, and with an opening at the top which is usually small, the crater often widening below in an inverted funnel form. They show evidence of a spattering type of activity as molten chunks or blobs of lava were ejected. Some of these cones now collect winter snows and freezing moisture which remain throughout the summer as ice.

Lava Flows—Lava Tubes

Comparatively little of the vast lava flow which covers most of the monument has erupted from craters, for it is evident that most flows oozed in peaceful fashion from numerous fissures and openings of the Great Rift. There are two types of lava flow: the aa (pronounced ah'-ah) which is extremely rough, broken into irregularly shaped blocks with jagged corners



Pahoehoe lava near Indian Tunnel (Franz Lipp photo)

and sharp spines, very difficult to traverse, and the pahoehoe (pah-hoe-ay-hoe'-ay) type which has a smoother surface of billowy, ropy conformation. The pahoehoe type is comparatively easy to walk across notwithstanding a wide variety of lava twists, folds, pleats, ruffles, bumps, and holes. Both flow types are dark in color; but some pahoehoe flows, notably the Blue Dragon, show a highly polished, or glossy, veneer which is iridescent in sunlight. Pahoehoe flows cover nearly half the monument. Seen from an elevation, some lava flows

resemble a wide smoothly flowing river. The very recent flow from North Crater is of this type and is of special interest because it shows so clearly how the side wall of a cinder cone gave way before the lava pressure. It also shows how the collapsed segments of the cone dropped upon the moving lavas and were carried away, piece by piece, floating on the lava stream for several miles.

Interesting lava tubes have produced the many "caves" and numerous natural bridges of the monument. A lava tube is formed within

the lava flow by the hardening of the surface of the molten stream and the stiffening of its side walls, while the liquid interior drains away leaving an empty tunnel of varying diameter in different flows. After the tube has formed, there are portions of its roof which are unstable and the collapse of a portion of the roof forms entrance to the tube, making a cave. Many such caves collect winter snow and frozen moisture to form "ice caves" in summer, a frequent source of water supply. Collapse of different parts of the roof of a tube may leave a narrow segment which forms a "natural bridge."

Lava Bombs—Tree Molds— Pit Craters—Water Holes

Among the curious lava features are the "bombs" which are scattered about the cinder and spatter cones, where the sputtering lavas have ejected blobs of magma varying in size from a quarter of an inch to several feet, and which hardened sufficiently while in the air to retain a globular tear drop, or spindle shape. Some of them have slender tails which are often partially broken away.

Tree molds are really lava casts of the trunks and roots of trees. They were formed by hot lavas flowing about the trunks of existing trees, cooling and hardening sufficiently upon contact with the moist wood so that the "mold," in the form of a cylindrical cavity, remained as the tree was completely consumed by the heat.

Pit-craters are common along the Great Rift, where subsidence of the lava after a period of flow has caused portions of the surface to collapse, leaving crater-like depressions. It is in these depressions that clear, cold water is often found. Most of such water is undoubtedly the result of melting snow and ice accumulations of winter in the ice caves and interstices of the very much broken lava flows. In many water holes, there is sufficient flow through the subterranean seepageways to keep the water cold and refreshing upon even the hottest days of summer.

Flora—Fauna

Contrary to general impression, a fair amount of vegetation exists, principally upon the cinder cones and cinder fields of the Great Rift. Limber pines, aspens, and choke cherries reach tree size, and shrubs such as mockorange, sage, bearmat, and rabbitbrush are common. Many beautiful flowers cover the cinder fields in season. The usual birds and small animals found in western semiarid areas exist in the monument, and deer are sometimes seen.

Indian Trails

Following the Great Rift is an ancient Indian trail which even today is readily discernible. There are legends of the Indians' use of the caves as safe strongholds and for transient habitation, while at Indian Tunnel there are perhaps 20 semicircular heaps of stones used to anchor the windward sides of teepees against the prevailing winds. Arrowheads and spearheads are sometimes found.

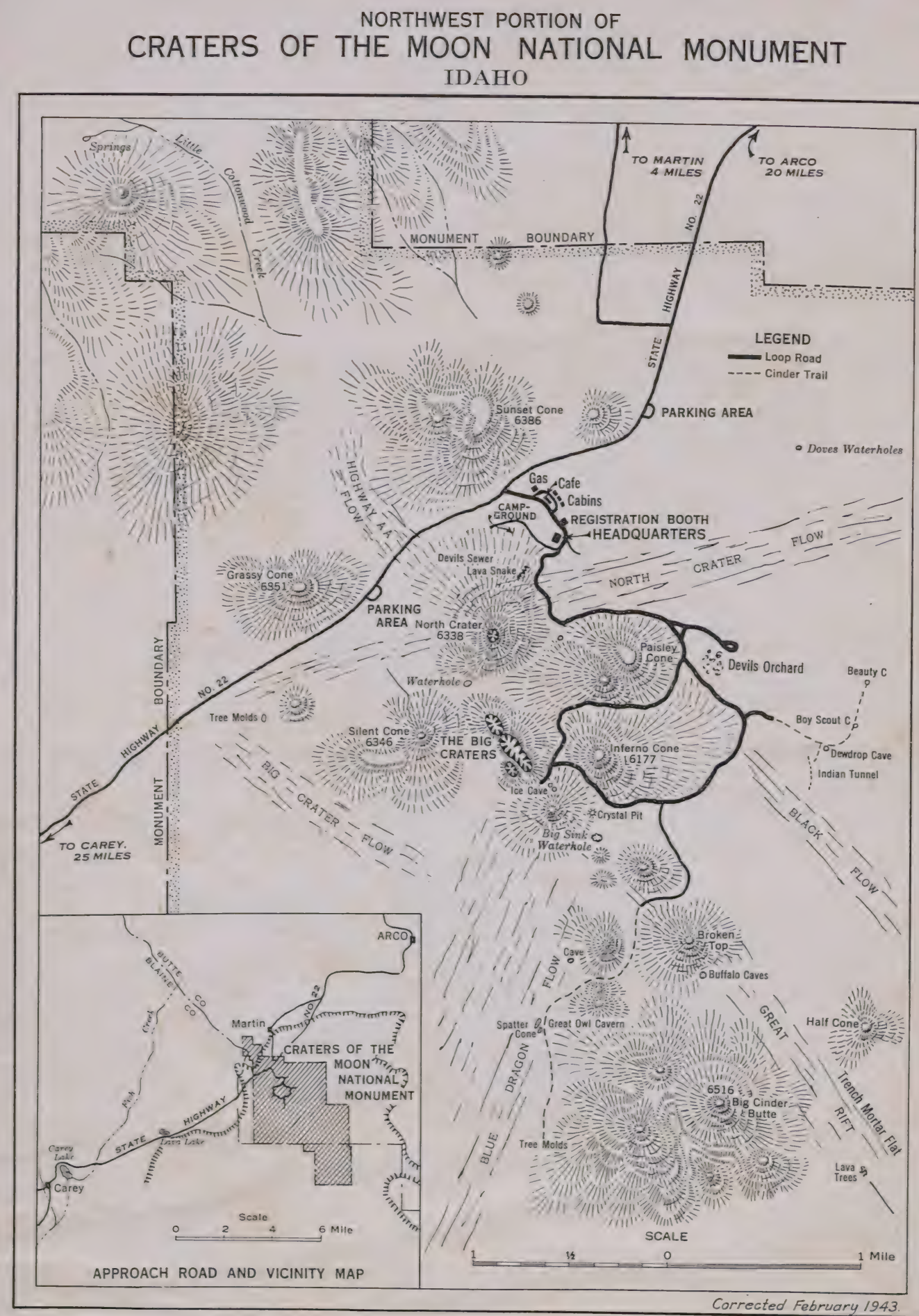
Facilities

Adequate camping space is provided at the monument, and a limited number of tourist cabins, with provision for meal service, are available during the season. A loop road southward along a portion of the Great Rift provides access to many points of interest.

Administration

Craters of the Moon National Monument is one of the areas owned by the people of the United States and administered for them by the National Park Service of the Department of the Interior. In these areas the scenery and the objects of historic, prehistoric, and scientific interest are carefully preserved and displayed for public enjoyment.

This monument is in immediate charge of a custodian, and communications regarding it should be addressed to the Custodian, Craters of the Moon National Monument, Arco, Idaho.



Craters of the Moon



NATIONAL MONUMENT
I D A H O

Sept. 8

Fayette Co. Penna.

steep dry slope

30106 Euphorbia

roadside

07 Stachys

in thickets and on grassy slope.

flowers white with deep purple anthers; plant strongly aromatic.

Sept. 8

more or less open ^{W. Penna.} bottom of wooded ravine.

2 08 Verbascum blattaria
flowers white.

1 19 Hieracium scabrum
flowers yellow

3 10 Aster
rays white

4 11 Sambucus
shrub 2 m. tall,
fruit black, sweet.

Sept. 3 Guntertown

3

Garret Co. Md.

roadside, probably
site of abandoned
dwelling

30112 *Tanacetum vulgare*

large thriving colony,
herb 0.3 m. tall; heads yellow.

13 *Fraxinus americana* L.

2 large trees, possibly planted.

14 *Euthamia*

heads yellow

15 *Aster*

heads rays pale

lavender.

Lupinus albus L.
common in partially
deserted bog.

shrub 1 m. tall, fruit
reddish black.

Abutilon L.
edge of thicket in moist meadow
large magenta-pink.

Sept. 13 Big Meadows
Shen. Nat. Park, Blue Ridge Mt., Va.

30116 *Gentiana quinquefolia*
occasional in sparse
woods.

flowers pale lavender-blue.

17 *Solidago squarrosa* Muhl.
occasional in open
meadow.

✓ clump, erect; flowers
yellow.

2 with
H. Septis
18 *Cirsium*
common in open meadow
erect, branched, 1 m. tall;
flowers bright lavender-purple.

19 *Sphagnum*
in slowly flowing
rivulet in bog.

20 *Heatonia*
same.

3 21 *Pyrus arbutifolia* s. *atropurpurea*
common in partially
deserted bog.

shrub 1 m. tall, fruit
reddish black.

21a *Achillea millefolium* L.
edge of thicket in moist meadow.
rays magenta-pink.

Sept. 13 Big Meadows
 then Nat. Park, Blue Ridge Mts. Va.
 30115 Gentiana quinquefolia
 occasional in open
 woods
 flowers pale lavender-blue
 31 Solidago speciosa
 occasional in open
 woods
 32 Chrysopsis erecta; flowers
 yellow
 33 Cirsium
 common in open woods
 erect, branched, 1 m. tall;
 flowers bright lavender-blue
 34 Phlox pilularis
 in rocky places in
 pool in talus
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 100

30122 Juncus
 in wet mud of bog.
 23 Lium
 in mud of bog.
 erect, 0.8 m tall, with
 strong oily odor. of thyme
 24 Juncus
 in mud of bog
 25 Epilobium
 in mud of bog.
 26 Juncus
 in mud of bog.
 27 Hypericum ~~perforatum~~
 common in partially
 desiccated portion of bog
 erect
 Sept. 13 Crescent Rocks
 then Nat. Park. Blue Ridge Mts. Va.
 28 Solidago serotina Hook.
 edges of thickets
 29 Fraxinus americana
 open woods.
 tree 3 m. tall, 4 dm. thick,
 bark very rough;
 leaves white beneath.

✓ Sept. 13 - Skyland S.N.P. B.R. Mt. Va.

2 30130

on large ^{any} vertical rock faces
dark brown. brittle

✓ Sept. 13 - trail north of Skyland,
w. base of Stony Man Cliffs
S.N.P. B.R. Mt. Va.

wooded cliffs and talus

1 Sept. 31 Eragrostis
weed in trail

3 32 Muhlenbergia schreib.
common weed in trail J.F. Gmel

3 33 Viola
along trail on talus
flowers purplish white.

42 34 Polygonum cuspidatum
around edges of old
garden appears well
established

1.5 m. tall.

1 35 Muhlenbergia
weed along trail

1 35a Gentiana clausa

30130

dark brown. little
or large, ^{any} ventral with four

Trail north of Siphon - C. K. K. K.
in base of Siphon
S. N. R. C. A. R. V.

covered cliffs and talus

181

Plant in flower

7 - *Myiarchus cinerascens* - common weed in trail

plai V 10

along road on table

Flowers purplish white.

28. *Polyporus confiditum*
Sacc. *luc.*

another appears well

schittae

Plot. no. 2.1

17. *Mutillidae*

first published

22a Gentiana linearis

30136 *Parmelia*
2 on rocks along trail

2 37 *Cladonia*
on earth bank

$$2 \begin{cases} 38 \\ 39 \\ 40 \end{cases}$$

on rocks

1 41 on rocks of overhanging cliffs.

Sept. 18 - e. of Trippe Run.

1 mi. s. of Falls Church, Fairfax Co.
in weedy garden Va.

7 42 Panicum
in full sun

4 43 Muhlenbergia
partially shaded

1948 Md.
Sept. 25 Bartlett's corner

30144 *Heterotheca subaxillaris*
weedy roadside
rays bright yellow

45 *Gymnopus ambrigenus*
common in
weedy recent clearing
caespitose,

46 *Aristida*
rare in
weedy recent clearing
caespitose.

30145 *Lamium*
weedy roadside
30146 *Chenopodium*
weedy roadside
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30196 *Chenopodium*
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30198 *Chenopodium*
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30199 *Chenopodium*
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30200 *Chenopodium*
weedy roadside

1898

Butcher's Corner

30144

very much

very bright yellow

very much

24

very much

very much

very much

24

very much

very much

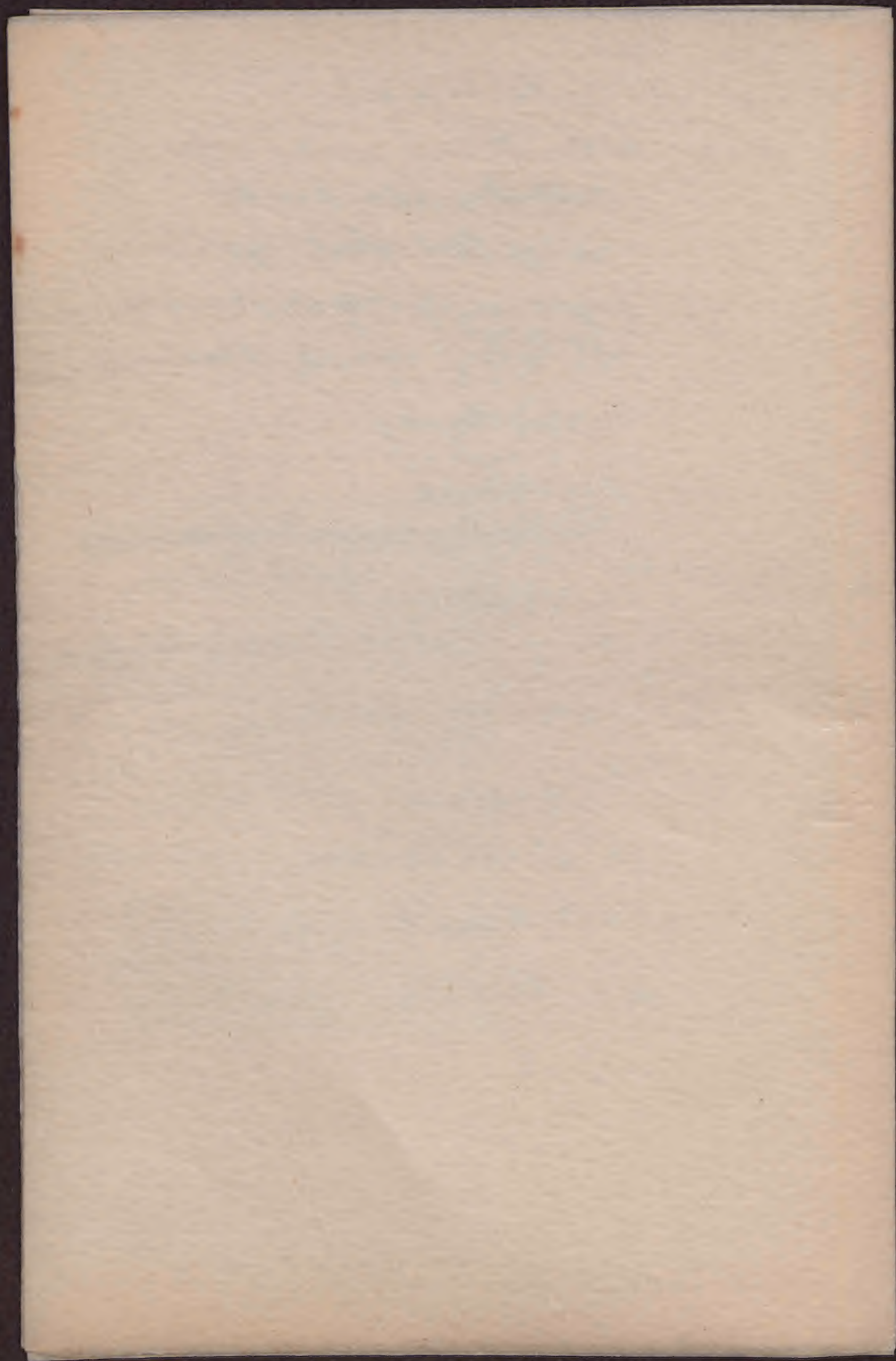
very much

very much

very much

very much

very much



① 1948 - Missouri - Illinois

Sept. 4 - mi. e. of

nos. checked
labels typed
XK

30098

abundant very locally on
railroad right-of-way, only seen
in one area a few hundred yards
long.

erect, flowers cream-white.

Sept. 5 - 3 mi. n.e. of Towanda, Ill.
(n.e. Bloomington)

mk Grove of mixed hardwoods on flat ground

30099 *Quercus stellata*

not common

tree 15 m. tall, leaves much more
dissected distally on branches.

30400 *Letaria*

under trees

erect

01 *Acalypha*

under trees

02 ~~Gaura~~ *Gaura* locally under tree
common, erect, 1 m. tall; flowers pink.

03 *Chenopodium boreale*
common under trees
erect, up to 1 m. tall

Sept. 5 - 1 mi. n.e. Braidwood, Ill.

roadside ditch in open flat land

04 *Dracocephalum* *Dracocephalum*
common, rose
erect, flowers pink, lower lip
punctate with maroon

05 *Gerardia*
common
flowers rose-pink

